MOTOR AGE

Vol. XXXI
No. 25

CHICAGO, JUNE 21, 1917

Ten cents a copy
Three dollars a year

JOHNSON'S
PREPARED WAX
NOW MADE IN
LIQUID FORM

Your Car Is Judged By Its Finish

IF the finish is kept in good condition your friends think you have a dandy car—but if it is allowed to get dull and grimy—it gives the impression of an "old boat"—no matter how good the car may be mechanically.

JOHNSON'S
PREPARED WAX

We are now making Johnson's Prepared Wax in *Liquid* form, which polishes much quicker than the Paste Wax. You can go over a good sized car in half-an-hour. It protects and preserves the varnish of ***new cars,*** adding years to the life and beauty of the finish. It renews an ***old car*** and saves the cost of revarnishing.

Absolutely Dust-Proof

Johnson's Prepared Wax Liquid gives a hard, glass-like polish which does not collect dust. It covers up mars and scratches—prevents checking and cracking—sheds water—and prolongs the life of a "wash".

Tell your dealer that Johnson's Prepared Wax is now made in ***Liquid Form*** and insist upon him supplying you. If he is unable to do so—send your order direct to us. We will prepay the express to any point in the United States east of the Rockies.

Quarts....$1.20 Pints....$ .60
(East of Rockies)

Write for our folder on Keeping Your Car Young—it's free

S. C. JOHNSON & SON, Dept. MA, RACINE, WIS.

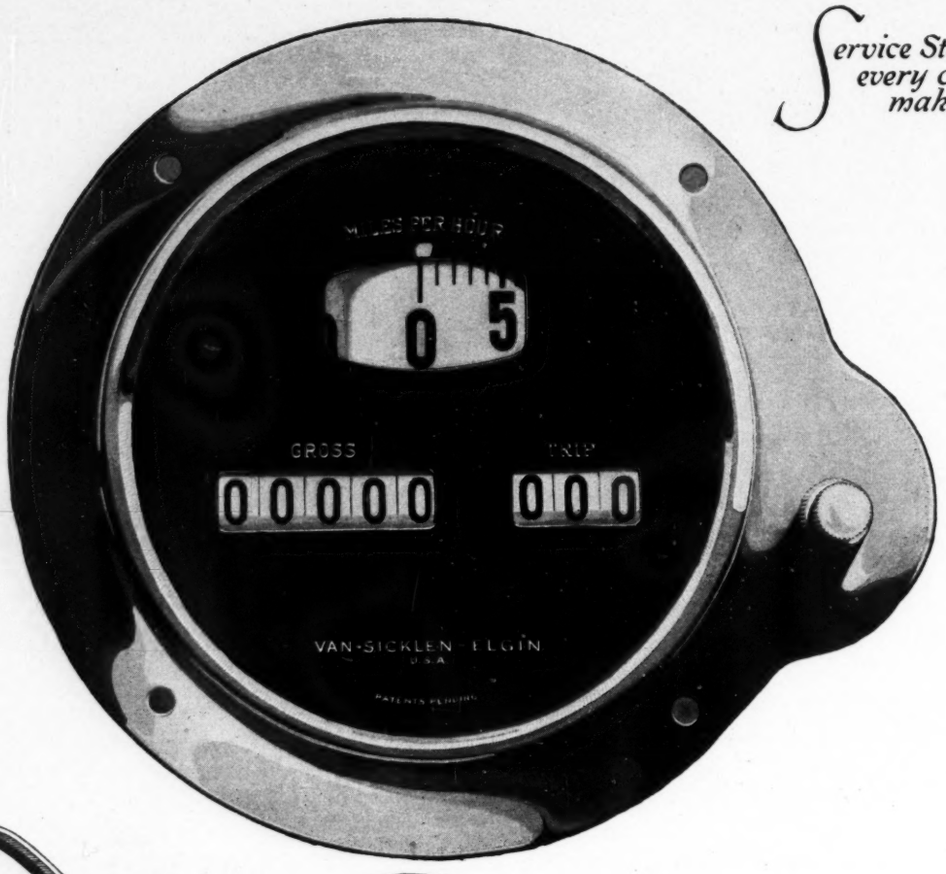
Apply with Cloth—Brush or Spray

Editorial Contents—Page 3

Advertisers' Index—Next to Last Page

In This Issue—Chicago Speedway Race

Service Stations in practically every city in which your make of car is sold



Van Sicklen

ELGIN

SPEEDMETERS

Built Like a Watch by Watchmakers in the Factory of the Elgin National Watch Company

Each Instrument a Masterpiece of Quality, Accuracy, Elegance and Service

Prices and Specifications Mailed on Request

The Van Sicklen Company — Elgin Illinois

MOTOR AGE

Published Every Thursday by the
CLASS JOURNAL COMPANY
Mallers Building
CHICAGO ILLINOIS

Entered as Second-Class Matter September 19, 1899, at the Postoffice at Chicago, Illinois, Under Act of March 3, 1897—Member of the Audit Bureau of Circulations—Copyright, 1917, by the Class Journal Co.
United States, Mexico and U. S. Possessions One Year $3.00
Canada .....One Year $5.00
All Other Countries in Postal Union.....One Year $6.00
BEWARE OF SUBSCRIPTION SOLICITORS OFFERING PREMIUMS OR CUT RATES—ALL CURRENCY SHOULD BE SENT BY REGISTERED MAIL.
RENEWALS or CHANGES OF ADDRESS should be sent two weeks in advance of date they are to go into effect. Be sure to send old as well as new address to avoid unnecessary delay. RECEIPT of first copy is acknowledgment of subscription.

Vol. XXXI Chicago, June 21, 1917 No. 25

Contents

COOPER WINS WAR DERBY AT 103.15 M.P.H.... 5
Stutz Shows Way to Mulford's Hudson by 43 Sec. —Military Maneuvers in Air and Field Thrill Record Crowd.
LELANDS QUIT CADILLAC..... 16
ARMY ROAD AROUND U. S.?..... 17
EDITORIAL—MAKING THE SPEEDWAY PAY—MOTOR CAR WAR TAX..... 18
AERIAL SCHOOLS CENTERED..... 20
TO STANDARDIZE AIRCRAFT..... 22
AIRPLANES FOR BUSINESS..... 23
MINISTERS FOR MAIMED MOTORS..... 24
ELECTRICAL EQUIPMENT OF THE MOTOR CAR 32
MOTOR CAR DEVELOPMENT..... 42
The Stephens Salient Six described and illustrated.

DEPARTMENTS

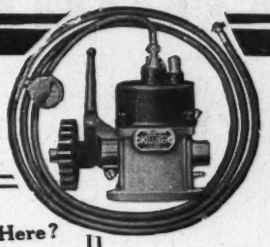
MOTOR CAR REPAIR SHOP..... 33
FROM THE WOMAN'S VIEWPOINT..... 34
READERS' CLEARING HOUSE..... 36
ACCESSORY CORNER 44
AMONG THE MAKERS AND DEALERS..... 46
FROM THE FOUR WINDS..... 48

ANNOUNCEMENT

Next Week—Permanent Road-Making Materials. The subject of material for road construction is timely just now inasmuch as the government has ruled that this class of freight shall take preference over all other. Further, the necessity for permanent roads is acknowledged now as never before, for it is the all-year road that is necessary for military use. First the subject of brick roads will be dealt with and in a later instalment concrete and other forms.

Recommended!

Owner Dealer Manufacturer



Is Your Car Here?

BUICK
CHALMERS
CHANDLER
CHEVROLET
DODGE
FORD
HUDSON
HUPMOBILE
KISSEL
NASH
OLDSMOBILE
OVERLAND
PAIGE
REO
STUDEBAKER

Dealers equip these cars and many others

THE FACT THAT KELLOGG PUMPS have been selected by most of the leading manufacturers for regular equipment of their cars means superiority.

AND THE ADDITIONAL FACT that motorists owning such cars are persuading their friends to install a KELLOGG is a strong endorsement of the manufacturers' judgment.

KELLOGG Engine Driven Tire Pump

EXTRAORDINARILY WELL BUILT, of all-metal construction, accurately machined, and with babbitt bearings, the KELLOGG pump is quickly installed, easily operated, and lasts almost indefinitely.

IT IS ABSOLUTELY GUARANTEED to deliver no oil spray into the tires.

DEALERS find it profitable to handle, and a quick seller and friend maker. Write for generous terms and unusual sales helps.

KELLOGG MFG. CO., Rochester, N. Y.

STUDEBAKER
Commercial Cars

IN the Saturday Evening Post for this week (June 23rd issue) appears another full page advertisement of Studebaker Commercial Cars.

This advertisement illustrates the Studebaker Panel Delivery Car.

It shows a car in actual service delivering goods.

The photograph was taken in Philadelphia—although the home offices of the manufacturer owning the car are in New York.

Merchants who trade with that manufacturer—and there are thousands and thousands of them all over the country—will read this Studebaker advertisement.

Other manufacturers will be interested because the car has the name of a world-renowned house on its side.

Many national concerns like the one whose name appears in the photograph use Studebaker Commercial Cars because the equipment can be transferred from one branch to another and be driven 'cross country and never be more than one town distant from Studebaker service.

Hundreds of other concerns doing a nation-wide business have adopted Studebaker Cars as standard for the same reason.

Dealers who follow up this advertisement with the attractive, forceful folders, booklets, letters and other matter furnished by Studebaker will gain increased business.

This is just one of the ways Studebaker helps dealers to sell Studebaker Commercial Cars.

Perhaps Studebaker Commercial Car territory can be arranged for you. Write us today for detailed information.

STUDEBAKER

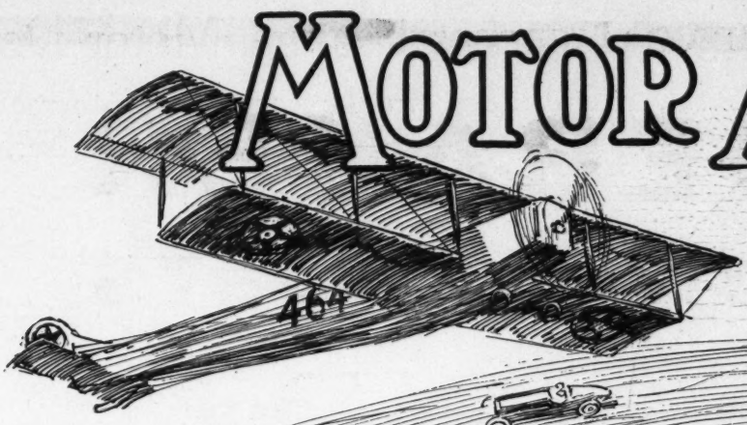
Detroit, Mich. **South Bend, Ind.** **Walkerville, Ont.**

Address all correspondence to South Bend

It pays to be a *Studebaker* dealer

Vol. XXXI, No. 25 CHICAGO, JUNE 21, 1917 $3.00 Per Year

MOTOR AGE



Cooper Wins War Derby

Mulford's Hudson Second

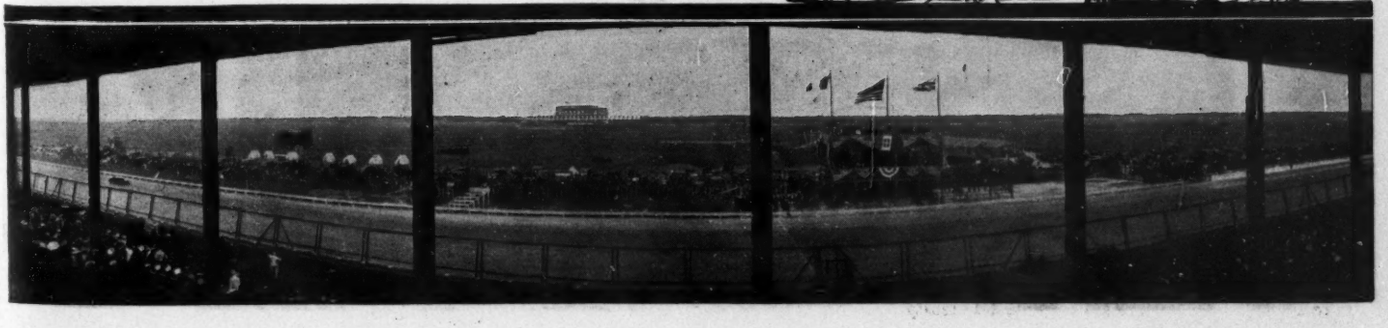
Patriotic Funds Benefit from Combined Military and Speed Program

How They Finished

POS.	CAR	DRIVER	TIME	M.P.H.	PRIZE
1	Stutz	Cooper	2:25:28.8	103.15	$8,000
2	Hudson	Mulford	2:26:11.03	102.62	5,100*†
3	Delage	Durant	2:26:36.43	102.04	2,100*
4	Duesenberg	Hearne	2:27:48.03	101.52	1,500
5	Mercer	Haines	2:30:56.43	99.39	1,000
6	Duesenberg	Henderson	2:33:07.95	98.09	1,000*
7	Hoskins	Lewis	2:35:08.07	97.60	800
8	Hudson	Vail	2:39:03.00	94.31	800*
9	Frontenac	Chevrolet	2:40:08.86	93.67	600
10	Mercedes	Fontaine	2:42:23.90	92.63	600
11	Packard	de Palma	2:43:08.46	91.95	...

† $500 for leading at each 100 miles.

* $100 for finishing equipped with A-C plugs.



Trenchant Cars and Charged Trenches Feature Motor Derby

Mulford Breaks Records in Intermediate Distances—Haynes Twelve Wins the Non-Professional Event

Earl Cooper, winner of 250-mile race, is presented with trophy

By Darwin S. Hatch

CHICAGO, June 16—Earl Cooper, 1915 road racing champion, this afternoon drove his white Stutz to victory in the feature event of the combined military, motor and athletic feats at the Chicago speedway, in a whirlwind finish, in which he nosed out Mulford, and won at a speed of 103.1 miles per hour for the 250 miles. His time was 2 hrs. 25 min. 28.8 sec., which was 2 min. 24 sec. lower than Aitken's record made at Sheepshead Bay speedway, Sept. 30, last year, and is 1 min. 11 sec. lower than the Chicago track record made by Resta last year.

The finish of Cooper's white Stutz as the winner was one of the most spectacular which has been offered to racing fans in years. Mulford's Hudson, after leading the field for the last half of the race, trailed Cooper across the tape for second place only 42 sec. behind, with Cliff Durant's Delage 2 minutes behind Mulford.

Mulford Sets Records

Although he was beaten for the stellar honor of the day, Mulford broke the world's speedway record for the 150 and 250 mile distance, and it was probable his record will be made official. He also added to his laurels by gaining the distinction of winning the two moneyed intermediate distances by leading at 100 miles and 200 miles, and acquiring a bonus of $500 for each.

The new world's records established by Mulford, both of which supersede those made by Aitken at Sheephead Bay Sept. 30, 1916, are:

150 miles—1 hr. 26 min. 14.9 sec.

200 miles—1 hr. 55 min. 15.0 sec.

Cooper's victorious finish ended a most excellent example of consistent and heady driving, coupled with a measure of good luck. During the early part of the race Cooper was not up among the leaders but toward the middle began to show in the money and steadily climbed, until after 170 miles he was running second with Mulford as the leader, and when the Hudson lost its position on account of a short pit stop within 15 miles of the finish, Cooper sprung into the lead, and he did it by going through the entire race without a stop, the only one to finish without halting at the pits.

Mulford seemed to have the race won up to the time he made his two stops and his only two at the pits, but these delayed him so that he could not regain the advantage of Cooper.

Durant and Eddie Hearne driving desperately had a neck-and-neck fight for third place and to those who could take their eyes from the fight between Cooper and Mulford the battle for third position offered as many thrills as did the one for major honors. As it was, Hearne finished within one minute of Durant, according to the official time, so close in fact that the unofficial announcement before the times were re-checked gave third place to Hearne.

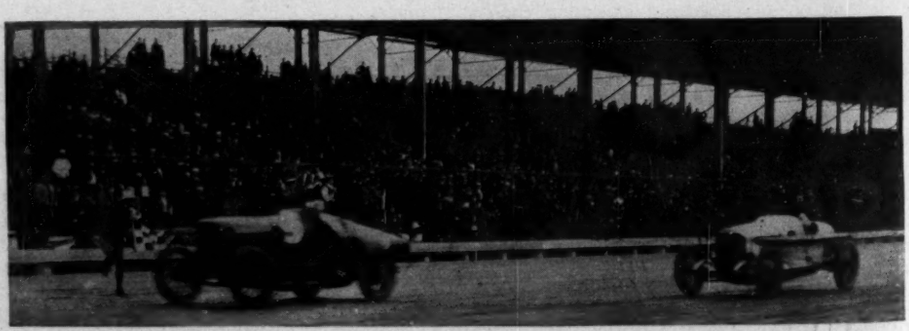
The first four to finish crossed the tape within an interval of 2 min. 20 sec.

Probably the largest crowd which ever witnessed a race at a local speedway saw the battle of motors today, the attendance being numbered from 40,000 to 60,000. Official figures are not announced at this time. The grandstands and bleachers were well filled before the big race and every available parking space was taken. Four hundred cars were parked outside of the gate on Twelfth street.

Today's program of the speedway turned out to be a well-arranged and well variegated series of events. President Reed of the speedway states that the speedway made money today. Enough was taken in at one gate to pay expenses. What the total receipts will be, and the exact total of attendance was, cannot be determined as yet. The fact that the speedway management appealed to the patriotic impulses of the public and also offered military events on the program, probably had something to do with the good turn-out, as did a mild and sunshiny day. The patriotic funds, which it is understood are to get 25 per cent of the gross proceeds, will benefit thereby.

No Bad Accidents

Fortune favored the races and the speedway management inasmuch as there were no accidents which caused injury to participants or spectators. Had there been a bad spill on the track, only the greatest of good luck could have prevented a bad pile-up, because there was not a flagman in evidence around the track. According to an official of the American Automobile Association, no flagmen were provided. A number of umpires were appointed, but



The only photograph taken of the finish. Ralph Mulford getting the chekered flag for second place

Times of All Finishing Cars in the Chicago Derby Every 20 Miles—250-Mile Event, June 16, 1917

No.	Car and Driver	20	40	60	80	100	110	140	160	180	200	220	240	250	M.P.H.
5	Stutz-Cooper	11:37.1	22:37.8	34:49.5	46:37.5	58:20.6	1:09:58.3	1:21:44.1	1:33:21.7	1:44:58.7	1:56:40.9	2:08:08.1	2:19:42.9	2:25:28.8	103.15
9	Hudson-Mulford	11:29.5	22:53.4	34:18.6	45:47.1	57:21.6	1:08:58.3	1:20:31.8	1:32:00.2	1:43:34.7	1:55:15.0	2:07:55.4	2:20:28.7	2:26:11.03	102.62
35	DeLage-Durant	11:36.9	22:51.9	34:17.3	45:46.7	59:18.1	1:10:54.9	1:22:44.7	1:34:34.2	1:46:06.0	1:57:50.1	2:09:18.4	2:20:50.8	2:26:36.43	102.04
11	Duesenb'g-Hearne...	11:28.2	22:54.1	35:50.7	47:40.4	59:20.4	1:12:17.8	1:24:03.6	1:35:45.5	1:47:16.2	1:38:56.2	2:10:30.9	2:21:58.1	2:27:48.03	101.52
18	Mercer-Haines	11:28.7	24:12.7	35:49.1	47:39.6	59:17.8	1:13:09.8	1:24:47.1	1:36:22.7	1:48:01.3	1:59:35.0	2:11:16.4	2:23:53.3	2:30:56.43	99.39
8	Duesenb'g-Hend's'n..	17:49.2	29:40.8	41:24.8	53:14.3	1:05:01.0	1:16:52.9	1:28:46.5	1:40:26.7	1:52:01.2	2:03:37.5	2:15:12.2	2:27:07.4	2:33:07.95	98.09
12	Hoskins-Lewis	11:31.3	23:01.4	34:45.2	46:30.8	58:09.2	1:13:01.2	1:24:31.0	1:35:53.3	1:50:19.1	2:01:39.4	2:16:31.2	2:28:37.3	2:35:07.07	97.60
14	Hudson-Vail	11:26.2	22:52.2	34:17.8	45:39.0	1:03:25.9	1:15:03.8	1:27:24.8	1:38:57.3	1:50:17.9	2:01:39.9	2:12:53.5	2:29:57.4	2:39:03.00	94.31
1	Frontenac-Chev'let..	11:28.3	22:59.0	37:55.3	49:56.2	1:01:50.2	1:14:05.9	1:31:35.3	1:43:29.9	1:55:52.2	2:07:24.5	2:22:51.7	2:34:22.5	2:40:08.86	93.67
2	Mercedes-Fontaine...	11:45.9	23:28.5	35:14.6	47:00.2	58:58.9	1:24:37.6	1:36:35.9	1:48:18.8	2:00:07.2	2:11:53.5	2:23:48.9	2:35:44.5	2:42:23.90	92.63
4	Packard-DePalma...	11:27.7	23:02.4	34:39.2	46:28.8	58:07.4	1:09:43.7	1:21:25.7	1:33:17.5	2:01:55.9	2:13:34.15	2:25:25.7	2:37:15.5	2:43:08.76	91.95

All cars are specials.

they did not seem to be in evidence when they should have stopped what appeared to be one or two persistent cases of "trailing."

Scoring and timing were pretty well taken care of, and the score boards were not any further behind the race than usual.

There was a bad mix-up with the photographers. President Reid of the speedway engaging in a wordy battle with the knights of the camera, winning out so far as most of them were concerned. The photographers charge that Reid had his armed guards shut them all up behind wire meshes before the race was started, and tore from their caps the military passes which permitted them to take pictures. President Reid states that the photographers persisted in getting on the track when they had no business there.

One Finish Picture

In any event, the efforts of the speedway management and its armed guard resulted in only one or two of the camera operators getting any pictures of the race. There was only one picture taken at the finish, and that is reproduced on these pages, this being the finish of Mulford.

There was some talk of protest after the race, because Chevrolet was permitted to carry a second mechanic around the track to where Boyer was working on his car, making three in Chevrolet's car. Also, some of the contestants who did not finish in the money, then informally protested again Louis Fountaine being permitted to finish after he had pushed his car across the wire to the pits for repairs. It was not believed that these protests will be formally filed.

The program of the day's events was given a patriotic flavor by making it a benefit performance for war causes and also by featuring an exceptionally well-arranged sham battle in which 3,000 Chicago high-school cadets staged "an attack on the trenches," as a demonstration of the manner in which war is waged in Europe. Most of the parapharnalia of modern warfare was in operation, including preliminary scouting and bomb dropping by eight military aeroplanes from the United States Aviation School at Ashburn, their bombardment by anti-aircraft guns in the trenches, an armored tank whose armor consisted of cloth, gas bombs, exploding mines, etc.

This was preceded by a demonstration of military transport of troops by motor when the 3,000 cadets were transported 13 miles in motor trucks and passenger cars from Grant Park to the speedway. A high-school athletic meet also was staged between races.

A Tire Race

To tell the running story of the 250-mile derby, which is the third running of this classic and is limited to 300 in. cars, is to tell again the oft-repeated story of a race that is won on tire stability. Cooper's tires stayed with him and he judged his speed so that they lasted throughout the race. Mulford's three stops which cost him the race were for tire changes.

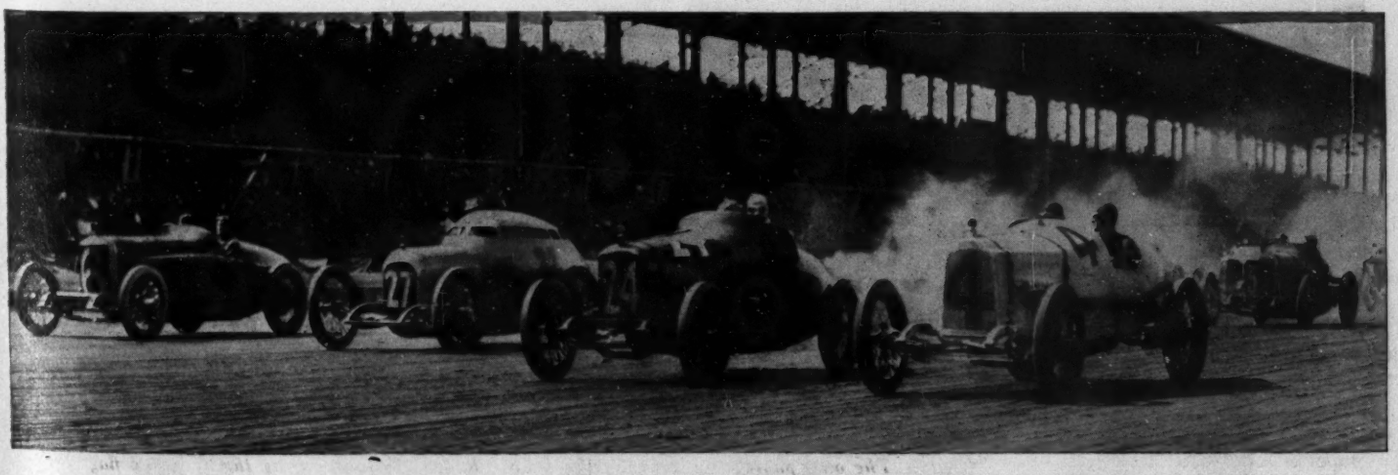
De Palma was the favorite with the spectators, but he failed to live up to their expectations, in spite of the fact that the Packard twin six generally was believed to be faster than any other car on the track, and that it made the best time in the qualifying trials, turning the course at approximately 110 miles an hour.

The Packard did have the early advantage, taking the lead before the tenth mile and holding it for three laps. But de Palma developed ignition trouble which slowed him down and he dropped back gradually until he put in a new storage battery, and then started out with scant hopes for regaining the lost time, finally finishing in eleventh place.

Oldfield Withdrawn

Oldfield, whose new car had been widely heralded and aroused great interest among the spectators, withdrew after running 48 miles. He managed to take the lead in the sixth mile and held it for another lap, then dropped back to second, and the tenth mile when de Palma passed him, in a thrilling neck-and-neck brush, in front of the grand stand. From then on Oldfield did not figure among the contendants.

Oldfield's new car, popularly called the Golden Egg, proved to be a lemon, temporarily. It has a construction with which Oldfield expected to increase the safety and at the same time, decrease the wind resistance. It has been mentioned before as Oldfield's Submarine, in which driver and mechanic are completely inclosed in a sheet steel house, shaped to cut down wind resistance, the only opening being rather narrow slits through which the occupants may look. In practice, Oldfield had wire mesh in front of these slits, but removed the mesh before the race because it interfered with his vision. It has an aluminum engine built by Harry Miller, and probably can be developed into a car of continued speed.



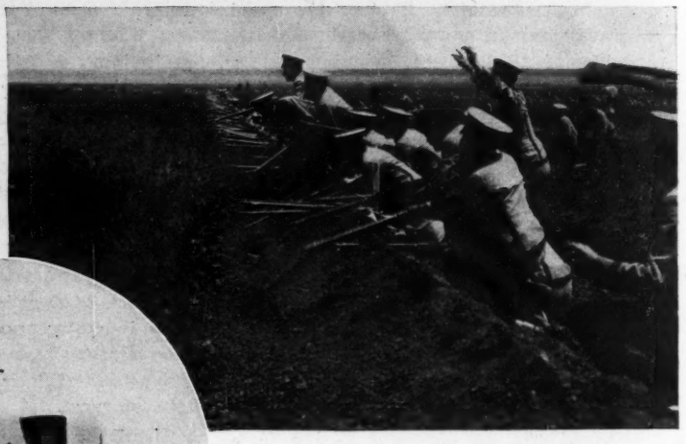
The start of the 250-mile race. From right to left, de Palma, Oldfield, Thomas. Oldfield's Golden Egg is No. 27

War Aspect at Chicago Speedway, June 16

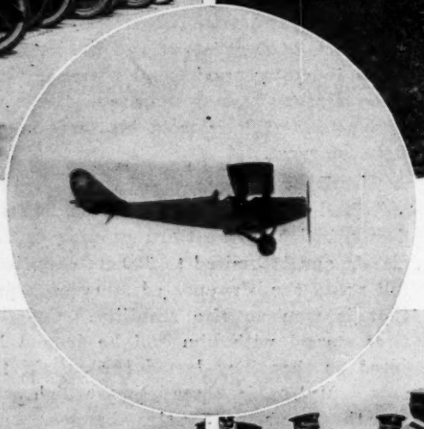
The infield of the Speedway took on a military aspect soon after 9 o'clock and continued to be a "battlefield" throughout the day

Cadets, war planes, armored tanks and other paraphernalia were to be seen everywhere. Trenches had been thrown up even

Motor cars furnished by enthusiastic and patriotic patrons lined up ready for the run to the Speedway



A close-up of some of the trenches thrown up in the infield and manned by high school cadets



The smoke curtain in the portrayal of the Somme was realistic

High school cadets charging the enemy trenches, supported by an armored tank

In circle — An army war plane

Below — Two trucks of cadets

Cliff Durant, who put his Delage in third place

Twenty-seven cars lined up for the start in the order of the speed made in their qualifying laps, the fastest car at the pole. They lined up four abreast in seven ranks, except the last row, which contained only three cars. De Palma, by virtue of his qualifying speed of 110 miles an hour, had the pole position and the front rank for his Packard twin-six. Next him was Boyer in the Frontenac, and beside him Barney Oldfield in his new Oldfield Special. The outside of the front rank was held by Joe Thomas, something of a dark horse from the West, who handled a Mercer. The second rank comprised Lecain's Delage, Al Schillo's Mercer, Eddie Hearne's Duesenberg, and Durant in the Delage that Oldfield drove at Cincinnati.

In the third row were Walter Haines, in a Mercer, Earl Cooper's Stutz, Louis Fountaine in de Palma's old Mercedes, and Ira Vail in the Hudson.

The fourth row was Taylor in the Newman Special, George Buzane in the Detroit Special which Rickenbacher built before he was sent to Europe with General Pershing, and Louis Chevrolet in the Frontenac which won the Cincinnati race. The fourth in this row was Patterson in the Hudson.

Mulford's Hudson had pole position in the fifth rank, with Andy Burt in the Erbs Special, Dave Lewis in the Hoskins Special and Pete Henderson's Duesenberg.

The sixth series comprised Tom Alley in the new Pan-American, which he had completed the night before the race, Henning in the Ogren, Devigne in the Delage and Omar Toft in his Omar Special from the West.

The tail-enders were Diedrich's Duesenberg, Milton's Duesenberg and Mason in an Ogren.

Five other cars had been entered, but did not show up at the driving line. These were the two Crawfords, one Olsen Special, Ostwig's Special, which could not be gotten ready in time after the fire at Cincinnati, and a Johnson Special.

At 2:56 the starting bombs gave the signal for the preliminary lap, and the twenty-seven cars got away in good order. They came around to the starting line well lined up and Starter Wagner's flag sent them away on the 250-mile grind.

Boyer Leads First

A cannonade from the quickly opened throttle gave evidence that the race was on. Joe Boyer shot out from the bunch and took the pole away from de Palma at the beginning of the first lap. At the end of the first lap, Boyer was leading with de Palma second and Barney Oldfield third. These three somewhat ahead of the bunch. Devigne signalized his completion of the first lap by going into the pit and withdrawing on account of a cracked water jacket.

De Palma took the lead in the next lap, both he and Oldfield passing Boyer. In the third lap, Oldfield pushed to the front with de Palma second, Boyer third, and Joe Thomas fourth. Diedrich was the trailer of the field and away behind. At the end of the fourth lap, after eight miles had been covered, Oldfield had increased his lead on the field with de Palma second and

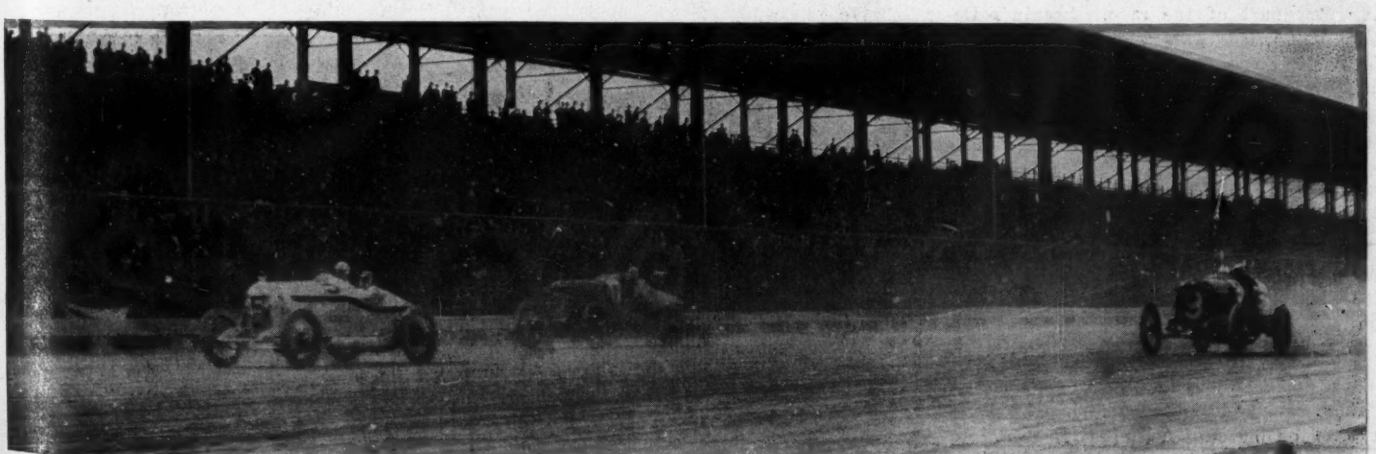
Eddie Hearne, who finished fourth with the Duesenberg

Joe Thomas and Louis Chevrolet running neck and neck for third.

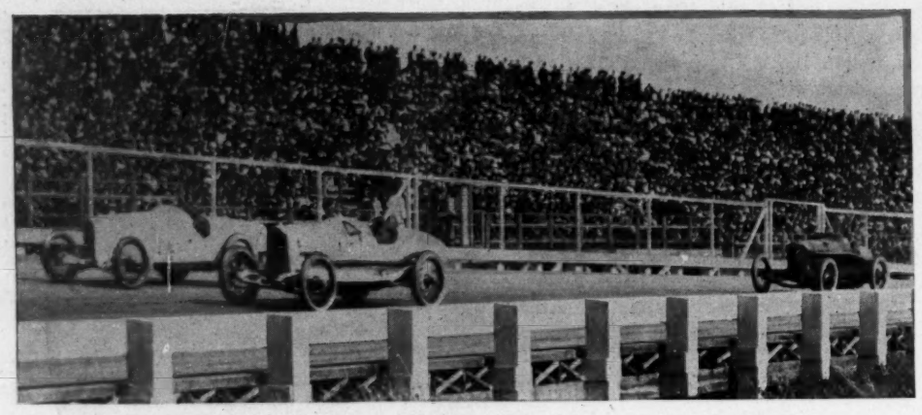
At ten miles, de Palma passed Oldfield in a whirlwind brush, right on the tape, with Louis Chevrolet third, Joe Thomas fourth and Boyer fifth. De Palma's time for the distance was 5 min. 43.5 sec., an average speed for ten miles of 104 m.p.h.

Before the next lap had been covered, Oldfield blew out the left rear tire and had to come into the pits. He took occasion to change both rear tires while putting on Goodyear cords instead of the fabric tires he started out with. On account of poor pit work he lost considerable time, over 2 min., as his pit men tried to put on a wheel carrying a small-sized tire, which was intended for a front wheel. This ended Barney's appearance among the leaders.

Louis Chevrolet again took the lead at the end of twelve miles, with de Palma second, Boyer third, and Joe Thomas fourth. At fourteen miles, Thomas had spurted up into first, and de Palma also passed Chevrolet, who was running third.



Cooper, in No. 5, and Mulford, in No. 9, in a brush past the grandstand



Henderson, No. 8, trails de Palma, No. 4, past crowded bleachers

The next lap saw the three leaders in the same position, with Ira Vail fourth and Art Patterson, in the other Hudson, fifth. Omar Toft was hitting very badly, and after a few more laps came into the pit with ignition trouble.

At the twenty-mile post, Ira Vail had gained the lead, with de Palma second, Hearne third, Chevrolet fourth, Haines fifth, and Mulford in sixth place. The time for the 20 miles was 11 min. 26.2 sec., an average of approximately 107 m.p.h.

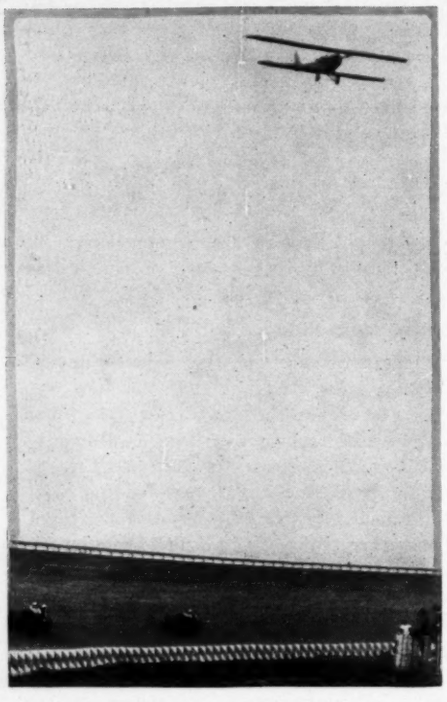
The terrific speed had begun to tell on many of the cars, and they were coming into the pits at this time with great frequency. Buzane went out at this stage with a broken piston, and Henning withdrew with a broken piston ring.

Thomas then forged to the front, driving like wild, and turning laps at a speed close to 107 m.p.h. Patterson came in with a badly twisted wheel and the examination at the pit developed that the frame also was cracked, so he withdrew. Thomas soon lost his lead and his participation in the race when on the twenty-fourth mile. His car skidded, turned completely over and jumped the track. Luckily, neither Thomas nor his mechanic nor any of the spectators were injured. Every effort was made to put the car back on the track, but it could not be gotten into shape in time.

Lecain Withdraws

This accident was the only thrill during the first part of the race. Lecain's Delage was withdrawn with a broken cylinder after the first half hour of running. The disappointed driver pushed his mount down past the grandstand to its dock at the pit. Around the 70-mile post, de Palma was averaging 102 m.p.h. and running in fourth place, Mulford having passed him for third. This was considerably slower than the time of Joe Boyer, who had jumped into the lead and had averaged 104½ miles for the 70 miles, with Ira Vail second, and Mulford third.

Chevrolet, who at that time had been tenth place, was running as fast as de Palma. Boyer lost his lead when he made a stop on account of plug trouble. It took him over 2 min. and he did not again show up among the first four or five. Vail



Military aviators add to the interest of the day

then took the lead and was leading at 80 miles at a speed of 105 m.p.h. Mulford was second. The same order and average speed was maintained at 90 miles.

Oldfield, meanwhile, was withdrawing for the reason, he announced, he had broken a valve-spring cup.

At the 100-mile post, Mulford, who had been gradually creeping up, went into the lead with de Palma second, Dave Lewis third, Eddie Hearne fourth, and Cooper fifth. The race for the next 60 miles was simply a one-two proposition, with Mulford leading and de Palma second, at a speed carrying between 104 and 104½ m.p.h. At 120 miles, Cooper began to show among the first three, and held that position for the next 50 miles, passing de Palma for second at 170 miles.

De Palma Stops

This time de Palma's ignition trouble began to evidence itself in his lowered speed and he stopped for nearly 15 min. to put in a new battery. This seemed to give new life to his motor and he made some fast laps, but could not pick up the time lost in the short distance yet to go. So, from 170th mile on, he no longer figured among those in the moneyed places. Third place was taken by Eddie Hearne at 180 miles, with Cliff Durant a very close fourth. Walter Haines was running fifth, and the following order of Mulford, Cooper, Hearne, Durant and Haines was maintained from the 180th mile to the 240th mile. Hearne and Durant were fighting it out for third place, sometimes one leading, and sometimes the other. Hearn had lost a lap about the 110th mile when he changed tires. Durant was pushing him very close, and the Hearne-Durant duel was as much a feature of the race as the Mulford-Cooper fight for first. At 230 miles, Durant definitely nosed Hearne out of third. At this time, Cooper was doing laps at 110 m.p.h.

Mulford Changes Tires

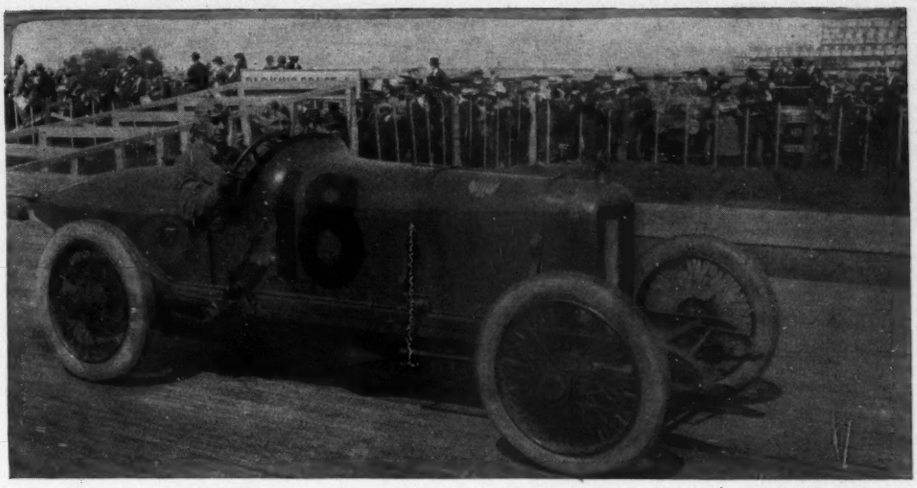
With only about 15 miles to go, with a lead of only 13 sec. over Cooper, Mulford was forced to come into the pits for tire change. Although he got away in 22 sec. by exceptionally rapid pit work, Cooper got too much of an advantage. Mulford's stop at the pits was one of the tensest moments of the race, with the spectator on their feet in a quiver of excitement and most of the pit men working like

Oldfield's spurt ahead of de Palma for lead early in the race

fiends to let the Hudson driver away as soon as possible.

Meanwhile Cooper continued his uninterrupted course around the track and at 240 miles had a margin of 46 sec. over the Hudson. Mulford, in trying to catch up, was doing miles at 109 m.p.h., and at the finish had cut the gap between Cooper and himself to less than 43 sec.

Durant and Hearne were not far behind, only a few laps intervening, and only one lap separating Durant and Hearne. They were running neck and neck, and when Starter Wagner gave Durant the green flag, Hearne thought it was for him. Early announcements also had Hearne finishing third, although the time put Durant 5 sec. ahead, and the official checking of the tape gave Durant an additional lap which made him third.



Walter Haines in the Mercer, which finished fifth

The Chicago Race from the Pits

Fouled Plugs from Over-Oiling Frequent Trouble

By B. M. Ikert

CHICAGO SPEEDWAY, June 16—Long before the starting hour of the big race there was a continuous babble of racing engines, some on the track and others in their garages, where drivers and mechanics were working feverishly on eleventh-hour changes on their mounts. All engines were snorting away in different dialects, eager, it seemed, to show their prowess to the increasing crowd. Every car which started in the big race had been previously examined carefully by the technical committee and the engines measured to see whether or not they were within the specified limit of piston displacement. This was soon over, and the race was on.

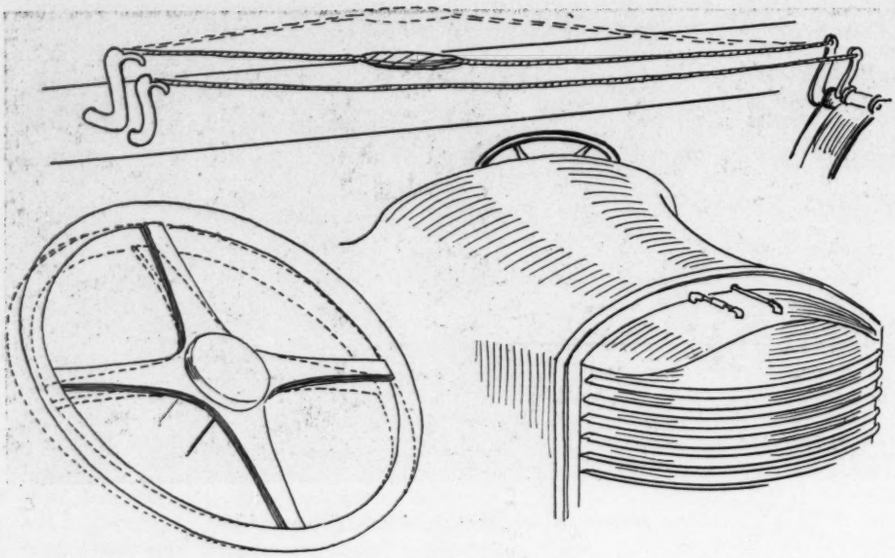
In a mechanical review of the occurrence on a race of this kind it is sometimes possible to extract lessons of engineering interest. A resume of the difficulties of the contenders will reveal that, as usual, the greater number of stops at the pits were for tires and spark plugs. The latter held good in the free-for-all race also, for out of the nine stops at the pits in this race, five were for plug trouble. In the big race, ten stops were made owing to the fouling of plugs. Certainly, it cannot be claimed that the plugs suffered from any inherent defect, inasmuch as the same make of plugs were performing admirably on cars which finished in the money. Examination showed that oil was getting past the pistons and fouling the plugs, and it is a noteworthy fact that nearly all the engines suffering from this defect were literally buried in an exterior coating of oil which had leaked past crankcase and cylinder joints. Perhaps the position of the plugs in the cylinder heads had something to do with the latter not functioning properly. It was also evident that on some cars the plugs were hard to get at owing to the fact that they were placed in inaccessible places.

Joe Boyer inspects his tires just before the start

Thirty-four Tires

Thirty-four tires were changed during the progress of the race, and of these Alley changed the greatest number, fitting in all six tires. The latter were all right rears. The veteran, Cooper, who drove the entire 250 miles without a stop at the pits, evidently had gauged his speed on the curves to a nicety, for his tires looked good for another race at the completion of the 250 miles. Right here it may be said that the speedy Stutz car he drove presented a cleanly appearance after the race in direct contrast to some of the other besmeared mounts. This might lead one to conclude that his car, being a tried product, together with the careful tooling and grooming of its driver, has had a chance to bind itself together in its various components. The engine joints held, no gaskets leaked and his engine presented a much cleaner appearance at the end of the contest than most of the others. The engine in de Palma's Packard also kept very clean during the running of the race.

Of the fifty-nine stops at the pits the first was made by Devigne in the Delage, who was put out of the race soon after the start with a cracked water-jacket. Shortly after him, Oldfield stopped for two rear tires. His pit work was slowed up, due to



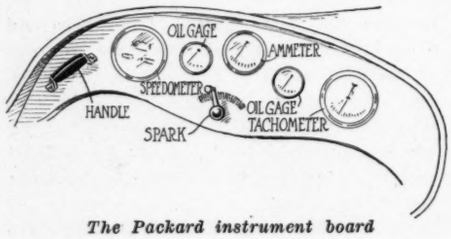
Three Frontenac features. Upper illustration shows brake control. Below the flexible steering wheel and the oil cooling device

the fact that his helpers put the small size tire on the rear and had to change this, which required 2 min. and 2 sec. Thirty-seven minutes after the start of the race Oldfield dropped out with a broken valve spring cup. Meanwhile, Thomas had also dropped out of the race by skidding on the back stretch and going through the fence. Thirteen minutes after the race started, Andy Burt and Newman stopped for tires. At this stage of the game, the Detroit Special, driven by Buzane, was reported out with a broken piston. Ogren, with Henning up, also dropped out at this point with a broken piston ring. The first Hudson to stop was that driven by Patterson, which came in 17 min. from the time of the start for a left rear shoe. Three of the contenders had thus far been eliminated, and the next to go out was Patterson's Hudson, which ran into the fence on the back stretch, causing a broken spring and twisting the frame to such an extent that it was impossible for him to go on.

Fontaine Pushes Car

Fontaine, driving the Mercedes, made his first stop at this point for a right rear tire, and his second, and last, stop was made 1 hr. and 5 min. after the start for replacing a broken valve spring retainer and changing plugs. He pushed his car to the pits for this stop, and after the race informal protest was made by some of the other drivers. The Omar, driven by Toft, stopped at the pits three times, principally on account of ignition trouble. This car also seemed to be afflicted with ignition trouble about half an hour after the start, and this manifested itself more or less throughout the race.

The longest stop was made by de Palma 43 min. after the start. He stopped for 14 min. and 50 sec. to take on water, change plugs and install a new battery. After the installation of the latter, his car seemed to have a great deal more speed, which if he could have kept up, before the stop, would undoubtedly have placed him in the money if not the lead. His first stop was made 34 min. after the start when he came in for water and a rear tire. Hearne, in a Dusenberg, stopped but twice at the pits during the race, in both cases for a rear tire. Lewis and Mason each made four stops at the pits, the principal offenders for the former being tires and plugs. Mason, driving the Ogren, suffered mainly from fouled plugs and 48 min. after the race started was forced out on account of a broken valve rocker.



The Packard instrument board

Thirty-one minutes after the start Lecaine brought his Delage into the pits with a broken cylinder head, forcing him out of the race. Mulford made his first stop at the pits 1 hr. and 43 min. after he had started to change a right front tire. His last, and costly, stop was made 2 hrs. and 16 min. after the start of the race, when he was forced to change a rear tire. This was done in 22 sec. A noteworthy feature of the race was the way in which the Hudson pit performed. Evidently much rehearsing had been done previously inasmuch as none of the men dashed about helplessly in endeavoring to perform his task when a Hudson car came in. In other words, each man was in his place and did the right thing at the right time.

Newman Stops

After running about half the race, Newman drove in with a bent front axle and spindle, which threw his left front wheel out of line. The technical committee made an examination of his car and finally allowed him to go on. This stop resulted in his losing a little over 4 min. Two hours and 32 min. after the start, Newman abandoned the race, probably on account of the difficulty of handling the car, due to the bent axle.

Chevrolet, driving the maroon-colored Frontenac, which was the lightest car in the race, made three stops during the entire race and each time for oil On one of his stops he took on an extra mechanic and carried him to the back stretch to the assistance of Joe Boyer who left the track. This caused an informal protest after the race by some of the other contestants. He stated after the race that he used about 20 gal. of lubricant and accounted for this by a leak in the oil tank which

Reasons for Withdrawal

NO.	DRIVER	CAR	LAP	CAUSE
15	Devigne	Delage Spl.	5	Water jacket
22	Henning	Ogren Spl.	12	Piston ring
17	Patterson	Hudson Spl.	21	Spring and frame
25	Lecain	Delage Spl.	17	Cylinder head
3	Buzane	Detroit Spl.	12	Broken piston
27	Oldfield	Oldfield Spl.	24	Valve spring cap
6	Thomas	Mercer Spl.	18	Left course
33	Diedrich	Duesenberg Spl.	16	Connecting rod
24	Boyer	Frontenac Spl.	66	Left course
31	Mason	Ogren Spl.	76	Rocker arm

The stop that cost de Palma the race—putting in new battery

Equipment of Cars in Chicago Derby—250-Mile Event

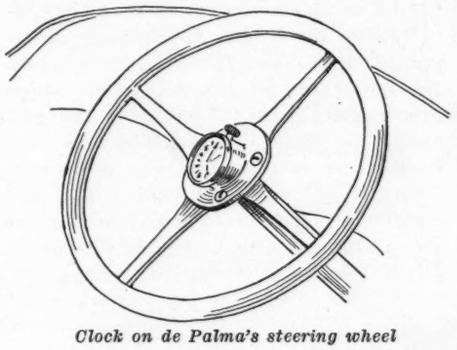
No.	Car	Driver.	Cyl.	Bore	Stroke	Disp.	Plugs	Carbureter	Ignition	Tires	Size	Wheelbase	Oil
1	Frontenac	Chevrolet	4	3.87	6.37	298.00	K.L.G.	Miller	Bosch	Goodyear	32x4½	104	Oilzum
2	Mercedes	Fontaine	4	3.829	6.50	299.39	A.C.	Mercedes	Bosch	Goodyear	33x4½ 33x5	112	Monogram
3	Detroit Spl.	Buzane	4	3.826	6.50	283.00	Grossman	Miller	Bosch	Goodyear	.....	112	Monogram
4	Packard	DePalma	12	2.625	4.50	299.00	A.C. and K.L.G.	Zenith	Delco	Goodyear	.....	112	Monogram
5	Stutz	Cooper	4	3.828	6.50	295.00	Rajah	Miller	Bosch	Goodyear	32x4½	102	Aristo
6	Mercer	Thomas	4	3.872	6.375	300.70	Rajah	Miller	Bosch	Goodyear	32x4½ 33x5	108	Oilzum
7	Duesenberg	Milton	4	3.75	6.75	299.00	K.L.G. and Rajah	Miller	Bosch	Goodyear	32x4½ 34x4½	106½	Oilzum
8	Duesenberg	Henderson	4	3.75	6.75	299.00	A.C.-Rajah	Miller	Bosch	Goodyear	32x4½ 34x4½	106½	Oilzum
9	Hudson	Mulford	6	3.502	5.00	288.60	A.C.	Hudson	Delco	Goodyear	33x5	107½	Oilzum
11	Duesenberg	Hearne	4	3.75	6.75	298.20	Rajah	Miller	Bosch	Goodyear	32x4½ 35x5	106½	Oilzum
12	Hoskins	Lewis	4	3.75	6.75	298.00	Rajah	Miller	Bosch	Goodyear	32x4½ 33x5	105	Oilzum
14	Hudson	Vail	6	3.522	5.00	290.00	A.C.	Hudson	Delco	Goodyear	32x4½ 33x5	105½	Oilzum
15	DeLage	DeVigne	4	3.78	6.00	280.00	A.C.	.....	.....	.....	32x4½ 33x5	106	Caster
16	Newman	Taylor	4	3.812	6.50	295.00	Rajah	Miller	Bosch	Goodyear	32x4½ 33x5	102	Oilzum
17	Hudson	Patterson	6	3.502	5.00	288.60	A.C.	Hudson	Delco	Goodyear	.....	105½	Oilzum
18	Mercer	Haines	4	3.872	6.375	300.70	Rajah	Miller	Bosch	Goodyear	32x4½ 33x5	108	Oilzum
22	Ogren	Henning	4	3.656	7.00	292.00	Rajah	Miller	Bosch	Goodyear	32x4½	106	Oilzum
23	Pan-American	Alley	4	3.625	7.00	289.00	Bosch	Miller	Bosch	Goodyear	32x4½ 33x5	106	Caster
24	Frontenac	Boyer	4	3.87	6.37	298.00	K.L.G.	Miller	Bosch	Goodyear	32x4½	104	Oilzum
25	DeLage	LeCaine	4	3.769	6.00	280.00	A.C.	Miller	Bosch	Goodyear	32x4½ 33x5	106	Caster
27	Oldfield	Oldfield	4	3.625	7.00	288.10	A.C.	Miller	Miller	Firestone	34x4½ 35x5	104	Oilzum
29	Omar	Toft	4	3.75	6.75	298.00	Rajah	Miller	Bosch	Goodyear	.....	106	Oilzum
31	Ogren	Mason	4	3.656	7.00	292.00	Rajah	Miller	Bosch	Goodrich	33x4½ 33x5	106	Oilzum
32	Mercer	Al Schillo	4	3.872	6.375	300.70	Bosch & Rajah	Miller	Bosch Miller & Bosch	Goodyear	32x4½ 33x5	... ...	Oilzum Oilzum
33	Duesenberg	Durant	4	3.78	6.00	280.00	A.C.						
35	DeLage	Andy Burt	4	3.638	7.125	295.00	K.L.G.	Miller	Bosch	Silvertown	33x4½	...	Oilzum
42	Erbes	Diedrich	4	3.75	6.75	298.20	A.C.	Miller	Bosch	Goodyear	32x4½ 34x4½	106½	Oilzum

allowed a great deal of the oil to be wasted. Another difficulty he encountered was the oil leaking upon the clutch, which caused the latter to slip so much that his speed was greatly reduced.

As is usually the case, little refinements presented themselves on the cars and probably one of the most noteworthy was the double system of drag-links on Oldfield's Special. This consisted essentially of a worm type steering gear, the transverse shaft of which carried at one end a ball-arm and drag-link to the left steering knuckle and at the other a spur gear. The latter meshed with another gear of exactly the same size mounted upon a short shaft extending over the frame of the car, to which was fastened a second ball-arm.

This was connected up to the right steering spindle with a similar drag-link as on the other side. In fitting this system of steering it was stated that the car would have a greater factor of safety, inasmuch as in case one steering arm broke the other would still hold. Also, much strain is taken off the front spindles by having a push on one and a pull on the other, whereas there is a greater strain on the spindle arm when but one drag-link is used.

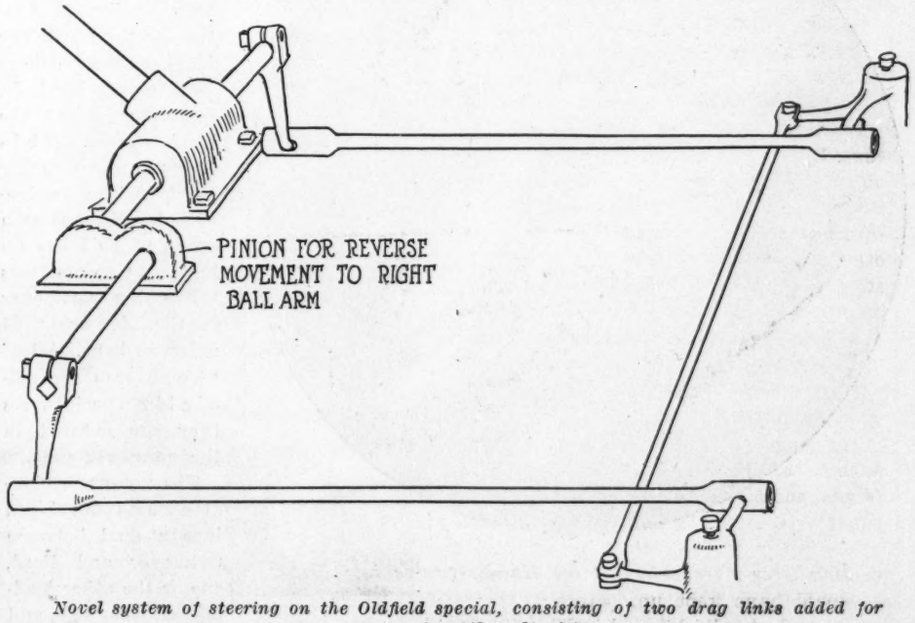
The Frontenac cars, which were the lightest cars entered, possessed many features not usually found on high-speed cars. There was a total absence of brake levers, one set being operated by a foot pedal as usual and any additional braking being supplied by the driver or mechanic reaching over the side of the car and grasping the taped portion of the cable which actuated the other set of brakes. The cable passed from one side of the car to the other so that either one could work it.



Clock on de Palma's steering wheel

Chevrolet had also fitted to the Frontenacs a flexible steering wheel which was designed to relieve the driver's wrist from all shocks. The spider of this wheel was made out of one piece of thin steel, which made it very flexible and at the same time strong enough for high-speed work. Provision also was made on the Frontenacs for cooling the oil, and this consisted of a series of fins fastened to the oil tank in such a position that a current of air struck them continuously while the car was in motion. It was this tank on Chevrolet's car that sprung the leak, and being directly over the cone clutch, caused the latter to slip by the oil getting into it.

Undoubtedly de Palma's Packard was



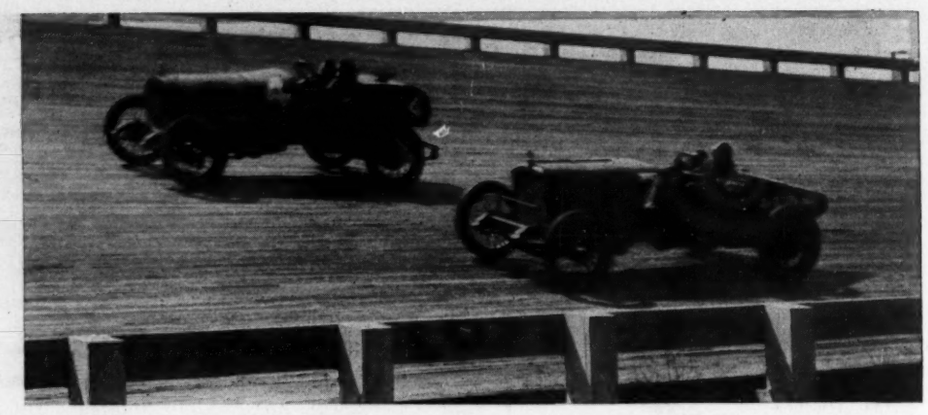
Novel system of steering on the Oldfield special, consisting of two drag links added for greater strength and safety

one of the prettiest jobs at the race. The engine of this car was fit to be a show model and much attention had been given to the details of it. Another noticeable feature of the Packard was the placing of a watch in the center of the steering wheel. A glance at the instrument board revealed a handle for the mechanic, speedometer, two oil gages, ammeter, spark lever and a tachometer—the latter showing the exact number of revolutions which the motor was turning. From this the driver could determine the speed of the car, inasmuch as he knew the engine revolutions. The Hudsons carried two carbureters.

In a race of this kind, where the average speed is over the 100 m.p.h. mark, stops at the pits are costly. This can be demonstrated best by the last stop made by Mulford for a tire, when he was in the lead. The stop, short as it was, nevertheless gave the wily Cooper a chance for the lead, which he maintained to the end. Thus, the luck of the game made it possible for the four-cylinder engine to vanquish the six, not because the latter was not fast enough, but fate had ordained that its tremendous burst of speed should be halted just when victory was in sight. The consensus of those in the know generally credits de Palma's Packard as the fastest car in America, and it is to be regretted that so fast a car did not finish in the money, owing to a defect, which while slight in itself, yet took about 15 min. to locate. A stop as long as this is fatal on a track as fast as the Chicago track, and the unfortunate driver usually finds himself hopelessly outdistanced.

All cars were equipped with Rudge-Whitworth wire wheels, except the two Ogren cars driven by Henning and Mason, which carried Houk wheels.

Dr. Percy Ford, who put his Haynes twelve into first place in the 100-mile non-professional, receiving the trophy from President Reid of the Speedway



A brush between the leaders in the non-professional race. Ford in the Haynes twelve passes Ortmayer in the Mercer for the lead

All cars were fitted with Goodyear cord tires, except the Oldfield Special, Erbes Special and the Ogren Hennings, which carried Firestone, Goodrich Silvertown and Goodrich Silvertown tires respectively.

Hartford shock absorbers were found on all the cars except the Mercedes and Detroit Special, which were fitted with Mercedes and Mondex respectively.

Every car carried a Boyce motometer, excepting Alley's Pan-American car.

The following used Dixon's graphite lubrication: Chevrolet, Boyer, Durant, Hearne, Milton, Toft, Henning, Mulford, Vail, Patterson and Oldfield. The Hudson team also used Whitmore lubricants for rear axle and transmission.

Oldfield used Firestones at the start of the race but early in the race changed the rears to Goodyears.

Haynes Wins Non-Professional

THE motor speed program of the day included two events, the first one a non-professional race of 100 miles. This was a free-for-all and of the ten entries seven cars faced starter Wagner for the get-away. Of these a Locomobile with Earl Leatherman at the wheel was withdrawn before it had gone 200 yards. The real contenders in this event were two Mercers and a Haynes twelve, the Mercers being driven by Arthur Bromstadt and Andrew Ortmeyer, a licensed Government aviator who had obtained a leave of absence from the military aero station at Ashton for the race. The Haynes was driven by Percy Ford Jr. connected with the local branch. This event was won by Ford in the twelve-cylinder Haynes at a speed of 89 miles an hour and second was taken by Ortmeyer in the Mercer at 84 miles an hour. All of these cars are officially specials, as they are entered in the non-stock race.

The non-professional event developed into a duel between Ortmeyer and Ford, one or the other leading all the way and interchanging positions frequently up to the seventieth mile, when Ford took the lead to hold it to the finish. Bromstadt ran a consistant third with Ed. Schillo's Mercer fourth. Ortmeyer and Ford ran neck and neck until about 75 miles, when the Mercer developed plug trouble probably, due to oil and lost some time at the pits.

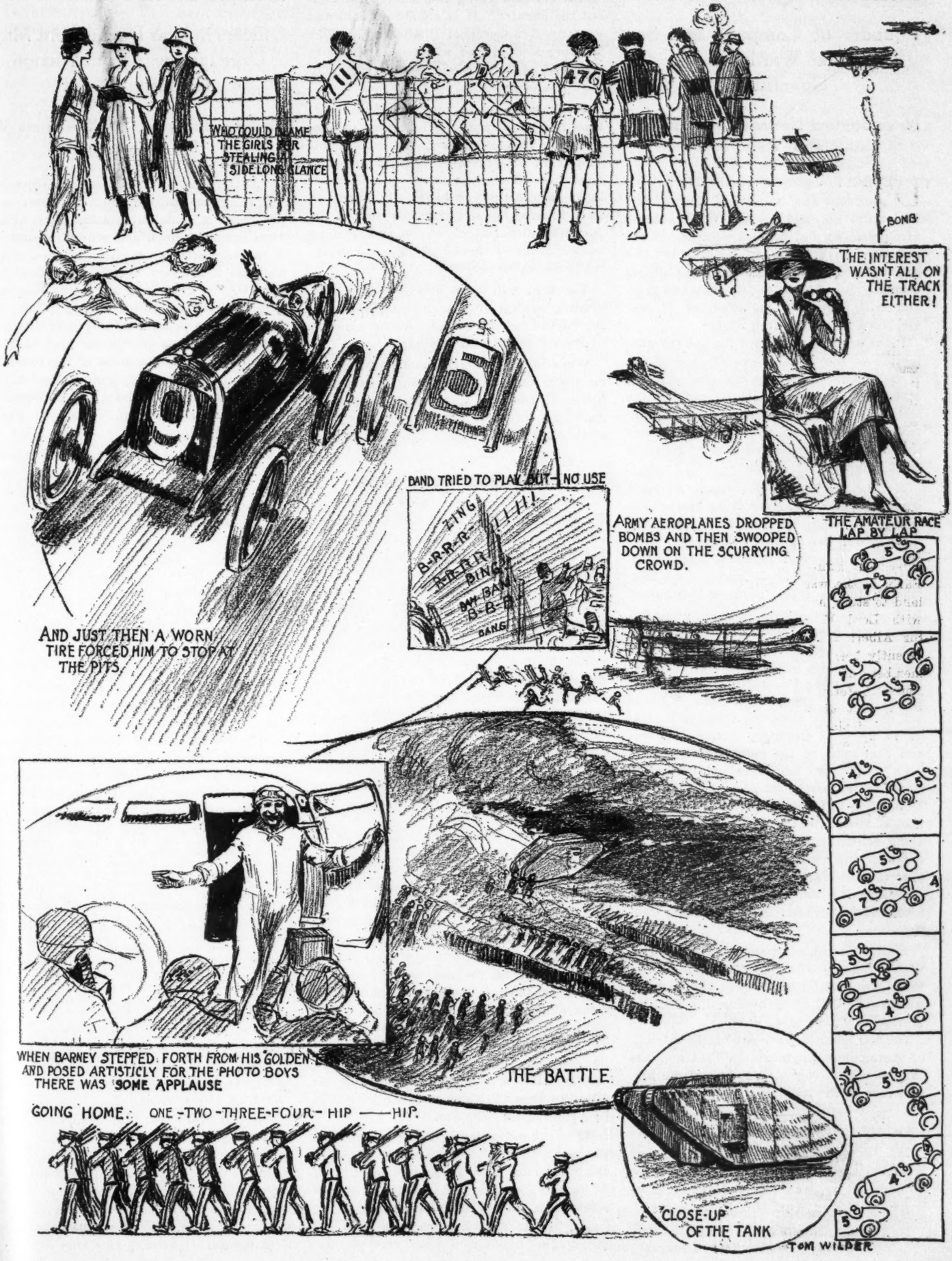
In the non-professional race, which preceded the big one, the Mercer driven by Canfield dropped out with a broken connecting rod, followed shortly by Nikrent driving a Paige, with a broken universal joint.

Few Silvertowns

The Locomobile driven by Leatherman started in the race but could not be kept going due to carbureter trouble and was withdrawn in the first lap. The rest of the cars to stop at the pits either chnaged tires or plugs. All the cars in this race carried Goodyear tires, excepting the Mercer driven by A. Bromstadt, which had Silvertown cord tires. The inability of drivers in this race, as well as in the big race, to get Silvertown tires was due to the fact that the Goodrich factory has turned over a large portion of its plant to the manufacture of dirigible balloon covers. Those who used Silvertowns undoubtedly had a supply on hand before the change was made at the factory.

The winning Haynes car, driven by Percy W. Ford, Jr., was fitted with a twelve-cylinder engine, Miller carbureter, A C plugs, Delco ignition, Hartford shock absorbers, Boyce motometer and used Sexton's castor oil.

Chicago Motor Derby as Seen by Artist Wilder


WHO COULD BLAME THE GIRLS FOR STEALING A SIDE LONG GLANCE
BOMB
THE INTEREST WASN'T ALL ON THE TRACK EITHER!
BAND TRIED TO PLAY BUT—NO USE
ZING!
B-R-R-R-!!!!
BING!
BW-BAN
B-B-B-
BANG!
ARMY AEROPLANES DROPPED BOMBS AND THEN SWOOPED DOWN ON THE SCURRYING CROWD.
THE AMATEUR RACE LAP BY LAP
AND JUST THEN A WORN TIRE FORCED HIM TO STOP AT THE PITS.
WHEN BARNEY STEPPED FORTH FROM HIS GOLDEN AND POSED ARTISTICLY FOR THE PHOTO BOYS THERE WAS SOME APPLAUSE
THE BATTLE
GOING HOME. ONE-TWO-THREE-FOUR-HIP ——HIP.
CLOSE-UP OF THE TANK
TOM WILDER

Lelands Quit Cadillac

Founder of Company and Son to Make War Planes for Government

Have Studied Needs of U. S. in Aircraft and Will Produce

DETROIT, June 18—Henry M. Leland, president and founder of the Cadillac Motor Car Co., and his son, W. C. Leland, vice-president and general manager of the company, have resigned. Both father and son will end their duties with the Cadillac company July 31, the end of the fiscal year, and will begin the manufacture of war airplanes for the United States.

Plans are going forward for the reorganization of the Cadillac executive staff. R. H. Collins, formerly sales manager of Buick Motor Car Co., Flint, Mich., and for the last year acting as assistant to W. C. Durant, president of the General Motors Corp., has been appointed general manager of Cadillac by Mr. Durant.

Mr. Leland is not yet ready to state where his new factory will be located, although he and his son have carefully mapped out the plan of procedure. They expect to manufacture on a huge scale. Early in the war Mr. Leland visited England to study aviation needs and conferred with Lord Montague, Lord Sydingham, Sir Albert Stanley, and others. He has recently been in constant conference with members of the Council of National Defense. Referring to airplane conditions he states that at the present time there is not an airplane made in America that is fit to fly over Germany during the war and that most of the machines that have been made were manufactured by enthusiasts for experimental purposes. He said he is going to help the United States put a fleet of aircraft in the air that will be built along scientific lines and will be safe to use over the hostile army. It is believed that the new factory will be located in or near Detroit. Mr. Leland and his son will retain their financial interests in the Cadillac Co.

Henry M. Leland founded the manufacturing concern of Leland & Faulconer in 1890. In 1902 he established the Cadillac Automobile Co., which became the Cadillac Motor Car Co. in 1904.

He was elected president of the Society of Automobile Engineers in 1913 and has for years been regarded as one of the biggest men in the industry.

AVIATION SCHOOL OPEN JULY 5

Mt. Clemens, Mich., June 18—The Joy Aviation Field which has been sold to the government as was reported in a recent issue of MOTOR AGE will be known officially as Selfridge Field, and will be ready for aviation work by July 5.

The field will be a replica of the others which are now being constructed throughout the country. It is a 600-acre field and contains 160 acres of timberland, which is being cleared and will be converted to construct corduroy roads over the surrounding grounds.

Work has been in progress for a short time and there are now in course of construction twelve hangars, two aero repair shops, six officers' quarters, six non-commissioned officers' quarters, school buildings, hospital power house, six barracks, four latreins, quartermaster's supply department, aerial supply depot, and machine shops. Some of these buildings are nearly ready for occupancy.

The field will be a complete city with grading, sewage systems, heating and lighting plants, school houses for the children of its occupants, and so forth.

When in full operation 900 students will be accommodated. The field is named in honor of the late Lieutenant Thomas N. Seldridge, the first United States navy or army officer killed while flying.

U. S. RUBBER ADDS STOCK

New York, June 18—The United States Rubber Co. has acquired the minority stock of the Rubber Goods Mfg. Co., thus solidifying its financial structure. This move will enable the company to take title to the physical property and all assets of the Rubber Goods company and will consolidate into the parent company the entire tire and mechanical goods portion of its business.

The United States Rubber Co., at the end of 1915, owned all but $1,532,300 of the $27,293,100 preferred and common stocks of the Rubber Goods company. By the end of 1916 this amount has been further reduced to $991,900. Now all of the minority stock has been purchased and the Rubber Goods company will have its capitalization reduced to some purely nominal figure like $100,000.

TO LIST AIRPLANE PLANTS

Chicago, June 19—The Council of National Defense has directed the Society of Industrial Engineers, organized here May 26, to gather complete data on the equipment of all plants in the United States that can aid in the manufacture of airplanes or parts of aircraft. The order came at the close of the national conference on industrial preparedness held under the auspices of the Western Efficiency Society and which closed yesterday. The society also will list all industrial engineers whose knowledge and training may be of service in the war.

The following officers were elected: Chairman of the board of directors, Charles Buxton Going, New York; treasurer, S. T. A. Loftis, Chicago; and assistant treasurer and secretary, G. C. Dent, Chicago. Mr. Going will have his headquarters in Washington, D. C.

U.S. to Push Road Work

Officers in War Department May Urge Highway Construction as Military Need

Priority Shipments of Materials to Be Advocated

WASHINGTON, D. C., June 18—Special telegram—Efforts on the part of governors of different states, state highways commissioners, and others interested in the successful prosecution of good road work as a military necessity, promise to meet with a gratifying degree of success, judging by the interest being taken in the matter of priority of shipment of road building materials by officers high in the War Department, members of the Council of National Defense, Logan Waller Page, chief of the roads division of the Department of Agriculture, and others in position to give aid.

General J. B. Aleshire, former Commissary-General of the U. S. Army, has been placed in charge of priority shipments by rail by the Council of National Defense and the needs of the road builders of the country will be submitted to General Aleshire by a special committee named to visit Washington within a few days for the purpose of submitting resolutions adopted recently at a meeting of good-roads workers in which present day needs are strongly set forth.

Mr. Page said he stands ready to give all aid in his power on having road buildings materials given preference by the transportation heads and he also said he believed the Council of National Defense, through its proper committee, would give a request of this character that consideration to which the matter is entitled.

The committee named to visit Washington is as follows: R. A. Meeker, state highway engineer of New Jersey; Hon. Carl Milliken, governor of Maine; Col. W. D. Sohier, chairman Massachusetts Highway Commission; Nelson P. Lewis, chief engineer, Board of Estimate and Apportionment of New York City; Charles W. Gates, former governor of Vermont; James H. Macdonald, former state highway commissioner of Connecticut; John F. Richmond, chairman State Board of Public Roads of Rhode Island; George P. Coleman, state highway commissioner of Virginia; H. M. Swetland, president Class Journal Co.; Arthur H. Blanchard, professor of highway engineering, Columbia University; E. L. Powers, editor *Good Roads*.

DEPARTMENT APPROVES PLAN

Detroit, June 18—The immediate development of the River Rouge to enable boats to reach the proposed new Ford blast furnaces has been recommended by Secretary Baker as a war necessity.

The Secretary of War mentioned the importance of the tractor as a means of increasing food production in connection with the river improvement, but pointed out specifically that the saving in transportation is a feature which makes this work imperative. He also stated that the Ford process of turning raw iron into fin-

ished cars and tractors, practically in one plant, will allow the use of vast transportation facilities for other purposes. The Secretary of War's recommendation was contained in a letter mailed to Chairman John H. Small of the committee on rivers and harbors and it is expected this letter soon will be presented to the house to support the amendment providing $200,000 for the River Rouge work.

The government action in pronouncing the Ford River Rouge activities important may have an important bearing on the Ford-Dodge suit so far as the attempt of the Dodge brothers to discredit this reject is concerned.

WILLYS TO HEAD CURTISS?

Toledo, Ohio, June 19—Special telegram—John N. Willys has been asked to become president of the Curtiss Aeroplane Co., and plans are being made for the erection of the main Curtiss plant at Toledo adjoining the Willys-Overland Co.'s plant.

WALL GETS COMMISSION

Indianapolis, Ind., June 17—William Guy Wall, vice-president and chief engineer of the National Motor Car & Vehicle Corp., has been selected by the War Department to assume charge of designing and production of armored cars and tanks for the army. Following a trip to Washington last week, he accepted the offer of the government and was commissioned a major by Secretary of War Baker.

BRISCOE SHOWS 39.2 M.P.G.

Dallas, Tex., June 18—The regular stock model Briscoe with stock equipment recently made 39.2 m.p.g. on a measured gallon of Texaco gasoline on the streets of Dallas and adjoining country roads. In another test by the local Briscoe dealer of four cars, a drive was made to Mineral Wells and return, a distance of 172.2 miles. One car made the entire trip on 6 gal. of fuel, averaging 28.5 m.p.g., another 28.17 m.p.g., and the third 27.4.

TRUCK DEMONSTRATOR SOON

Detroit, June 15—Rumors that the Ford Motor Co. is shipping demonstrator trucks to dealers at this time are untrue. Experiments with the Ford trucks are not yet completed at the Ford factory but MOTOR AGE can state authoritatively that all experimental work will be completed within thirty days and that at that time demonstrator trucks will be shipped to dealers.

TO ANNOUNCE INCREASE SOON

Toledo, Ohio, June 15—The Willys-Overland Co. is informing its dealers that it shortly will announce a definite price increase. The increase is due to the increasing cost of materials and labor, which is being experienced by the entire motor industry.

Army Road Around U.S.

Senate Bill Would Provide Military Marginal Highway Along Borders of Country

Good Roads Representatives Made Preliminary Draft

WASHINGTON, D. C., June 15—What will be known as the Military Marginal Highway Bill has been introduced into the United States Senate by Chairman George E. Chamberlain of the Committee on Military Affairs.

The plan provides for a main national highway along or near the Atlantic seaboard, the southern boundary and the Pacific Coast, with extension highway ultimately along the Canadian boundary of the United States. Provision is made for other roads intersecting the highway, the radial highways to be constructed by the states independently or with Federal aid.

The committee on the timeliness of roads legislation with comprehensive military preparation was composed of John A. Wilson, chairman of the A.A.A. military preparedness committee; George P. Coleman, president of the American Association of State Highway Officials; Samuel Hill, president of the Pacific Highway Association and John Craft of the Alabama highway department. George C. Diehl, chairman of the A.A.A. good roads board; Henry G. Shirley, executive chairman of the American Association of State Highway Officials, and Osborne I. Yellott, chairman of the A.A.A. legislative board, were entrusted with the preliminary draft of the bill.

REO WINS PATENT SUIT

Lansing, Mich., June 18—The Reo Motor Car Co. was completely exonerated by patent decision handed down by Judge Hazel of New York, June 13, in the case of William Barber vs. the Reo Motor Car Co. This was the case in which the patentee sought to recover $1,500,000 for alleged infringement of an ancient patent. In the preliminary skirmish, the Reo Motor Car Co. was given an adverse decision due largely to the fact that the company was certain that there was no similarity between the Barber patent and the Reo mechanism and failed to treat the matter seriously.

When the New York case finally came to trial, the Reo company introduced additional evidence with the result as above indicated—a decision to the effect that the Reo valve mechanism does not, either in design or in application, infringe the Barber patent.

ANNOUNCES SPORT ROADSTER

Cleveland, Ohio, June 18—The Jordan Motor Car Co. is now ready to make deliveries of its new Sixty sport roadster. This model is 200 lbs. lighter than its predecessor and is equipped with special Vanadium steel springs, the rear being 59 in. long. It is geared 4 1/2 to 1 and on numerous road tests has done over 60 m.p.h.

Special attention has been given to body lines—the line from the Motometer to cowl is straight and back of that point to the deck the line recedes gradually. Seat cushions are 10 in. thick and rest directly on the floor.

PULLMAN SALE HELD UP

York, Pa., June 16—Exceptions having been filed, the proposed sale of the Pullman Motor Car Company's plant in this city by the creditors to the National Products Co., Trenton, N. J., has been held up at least temporarily. Creditors of the company, represented by Attorneys Harvey A. Gross and Fred B. Gerber, of this city, on Friday filed their exceptions in the United States district court at Scranton, and Judge Witmer, at the request of the receivers, William A. Keyworth, Carlton L. Hoff and Henry D. Schmidt, of this city, will fix an early date for a hearing.

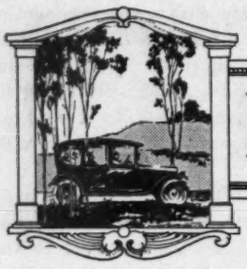
The National Products Company agreed to purchase the plant and assets except the accounts and bills receivable, for $260,000. This sum the company says is not enough, and another bid has been made, one of $315,000, by Samuel Winternitz & Co., Chicago and Detroit. Michael S. Niles, of this city, is the attorney for the receivers. Had not the exceptions been filed the sale to the National Products Co. would have gone into effect on Friday, June 15, according to the agreement entered into several weeks ago.

T. C. A. DIRECTORS

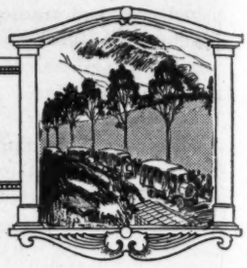
Chicago, June 18—The newly formed Touring Club of America perfected its organization at a meeting at the Chicago Automobile club last night by electing a board of directors composed of W. G. Tennant, Harry Newman, Thomas J. Hay, E. F. Meyer, John P. Dods, Burley B. Ayres, and B. F. Affleck. Arrangements are under way for making all local units of the national body affiliated organizations of the American Automobile association. The organizers are out for 10,000 members in the Chicago territory. When the local organization is completed a national membership campaign will be launched.

BLUE BOOK PUBLISHER DIES

New York, June 19—Max Holtz, president of the Associated Blue Books Pub. Co., publisher of the Automobile Blue Books, Motor Life and the Automobile Trade Directory, died in New York today from a nervous breakdown. He was widely known as financial expert in the dry goods field. He leaves a widow, a son, Howard, and a daughter.



EDITORIAL PERSPECTIVES



Making the Speedways Pay

THE management of the Chicago speedway is to be congratulated upon its wisdom in arranging the program which was sufficiently varied and of sufficiently timely interest to draw a crowd which for the first time in the history of the Chicago track paid expenses. The combination of military events in the staging of sham trench engagements, together with utilization of military airplanes and pseudo-tanks, combined with motor car races and variegated by athletic events, served to produce a variety of interests that drew the long-looked for crowd.

THE wisdom of the management in playing upon the patriotic interests of the public at this time by announcing a donation of a percentage of gate receipts to patriotic funds also had its effect. All in all, the day's program was one which deserved a crowd. The day when speed alone served to attract a large attendance is past. For speedway races and speedways to be profitable they must offer a show. The Chicago speedway has done it successfully.

IN the detailed arrangements of the race plans there were some things which need improvement. One of these is better arrangements for handling protographers. A number of regular photographers, whose business it is to picture national events and upon whom the public relies to provide photographic information to supplement that of the press writers, were prevented from properly performing their functions at the motor derby through what was neither their own fault nor wholly that of the speedway. The difficulty seemed to come through the issuance of credentials and military track passes to amateur and free lance photographers whose only adequate equipment was their nerve.

Motor Car War Tax

MOTOR AGE is in receipt of a letter from a reader criticizing its attitude with reference to war taxes and asking why this publication did not come out strongly against the proposed federal tax on owners as a war emergency measure, just as it did on the two proposed measures of the war finance bill, which the reader felt more directly affected MOTOR AGE's pocketbook. By this he referred to the proposed tax of 5 per cent on all cars built, which was to be collected direct from the manufacturers, and the proposed increase in second-class postage rate.

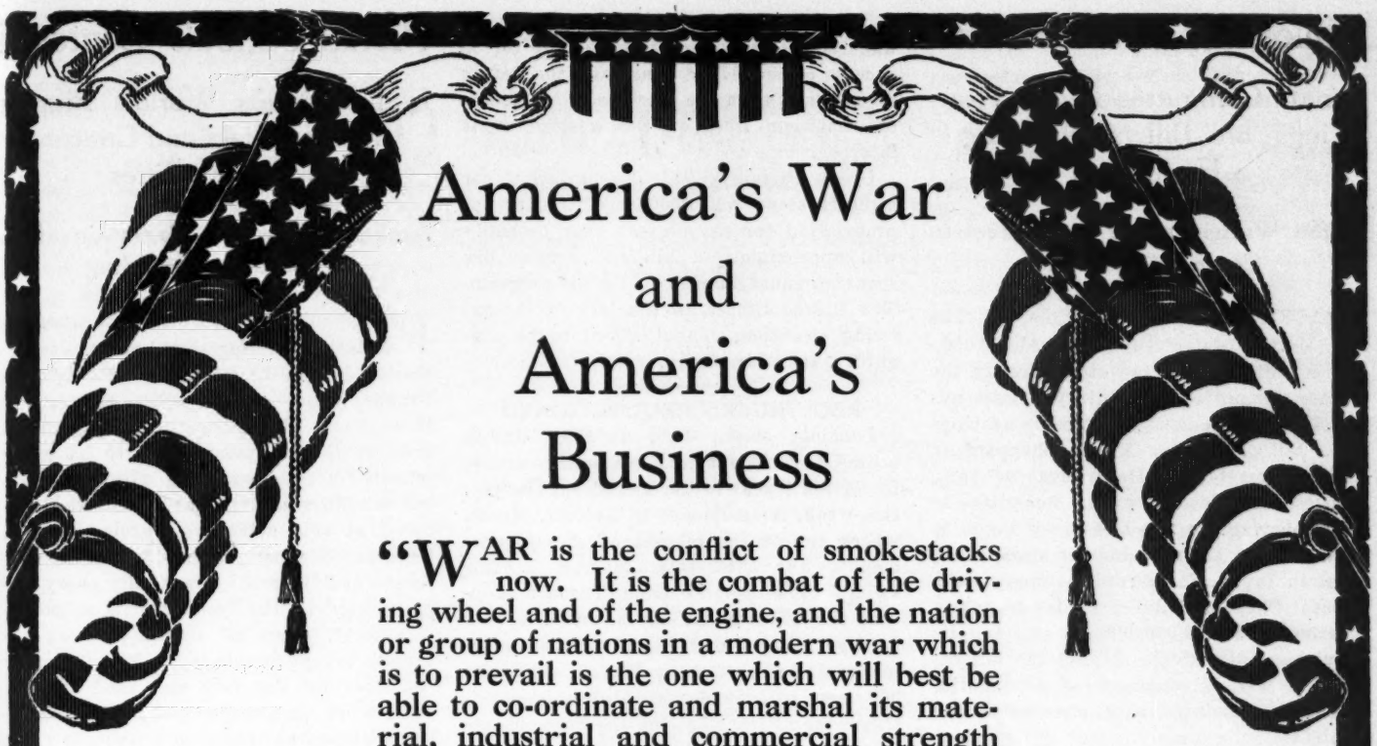
PERHAPS there are other readers who did not get the real distinction between these issues. MOTOR AGE in raising its voice against the clause which put a 5 per cent tax on motor cars at the source and the increase in second-class postage rates was moved by as patriotic impulses as when it defended the new federal license tax on owners. The manufacturers' tax on motor cars, had it become a law, would have put many motor car concerns completely out of business, would have crippled others so that the list prices of the cars would have to be increased more than the 5 per cent of the tax, would have made motor cars scarcer, and therefore more expensive for the owner to buy and run. Of course, it is definitely understood that though the manufacturer paid the tax directly, he would be forced to increase the list price proportionately.

THE United States needs motor vehicles in very large quantities for its military expansion and for carrying out successfully the plans for prosecution of the war. To have cut down its possible sources of supply by putting a proportion of the industries out of business would have made it impossible for the government to obtain the thousands of motor cars and trucks for which it is asking. Similarly, the very radical increase in postage rates on second-class mail matter, which was proposed, would have made it impossible for a large proportion of the publications of the country to have continued in business, in the face of present increased cost of paper, inks, engravings and other things which go to make up a publication. To have caused the discontinuance of those publications which would have been unable to continue would have been a result directly contrary to that desired by the measure as the income derived from those who survived under the new tax would have not been as great as the present income derived from a flourishing industry under the present more or less favorable conditions.

LIKEWISE, also, this tax, directed at the source, would have had to come directly from the pocketbooks of the ultimate purchaser, the subscriber of the magazine. The government is utilizing the entire press of the country in its enlistment, preparedness and financial propaganda and gives chief credit to the press for its successful floating of the Liberty Loan as a popular subscription. For the government to have weakened the press of the country in an ineffective effort to increase the income from that source would have weakened the very arm of the industry which is proving among those of greatest value to it.

IN spite of the fact that it is class legislation, a feature which will have to be overlooked as long as legislative bodies persist in considering the motor car a pleasure rather than a utility vehicle, the federal license tax on motor car owners is worthy of support. It seems to present a method of increasing the government's revenue which will not work a great hardship on any one industry or any one man. The amount of money which will be expended by any one individual owner is not sufficient to greatly increase his cost of operation. It is small as compared with the increased first cost of the cars due to the higher cost of material and labor. In other words, by the wide distribution of the tax over three million motorists, no one man's burden will be excessive.

THERE is another angle to the federal license tax on motors, which is the silver lining to the tax cloud. This is the very probable effect it will have on hastening the much desired substitution of federal licensing with federal number plates and with nation-wide reciprocity of licenses among all the states. If the annoyances due to the present system of state licensing are done away with through the influence of the present war measure, it will be worth all it costs to the motorists of America.



America's War and America's Business

"WAR is the conflict of smokestacks now. It is the combat of the driving wheel and of the engine, and the nation or group of nations in a modern war which is to prevail is the one which will best be able to co-ordinate and marshal its material, industrial and commercial strength against the combination which may be opposed to it."—Newton D. Baker, Secretary of War.

WAR is going to change American industries. The change will be gradual but profound. War has become a thing of industry and commerce and business. It no longer is Sampson with his shield and spear and sword, and Goliath with his sling; it is no longer selected parties representing nations as champions, and in physical conflict one with the other, Secretary of War Baker told the Editorial Conference of Business Papers in Washington recently. To that he ascribed the reason that America's entrance into the war is to have a profound effect on the industry of the country.

"THE character of war has changed, not only in the manner I have suggested, but it has changed in the place in which it is fought. There is no longer beating of drums and marching of bands and unfurling of flags across wide areas, with men going around mountains and meeting one another and fighting upon an open plane, but so far as land warfare is concerned, it is fought by men who never see one another's faces; it is fought by the use of weapons which are trained to indirect fire, and the mathematical and scientific processes by which observation is translated in the aiming of a modern high-powered gun, filled with science and accurate knowledge; but that is only the land end.

"THE very skies are filled with warriors now, and the underseas as well; and so we see that at least a part of the mechanical progress which has been made by mankind has been drafted into the making of what is now called the lethal weapon of war, and here in Washington we are undertaking now to marshal the genius and the vitality and the courage of a great peace-loving people, in order that they may throw their preponderating weight as a unit in this scale and rescue peace for the world.

"THE greatest asset we have is our habits; it makes unnecessary separate reasoning operations for a great variety of things which we are compelled to do daily, and it is not until we have converted an operation into a habit that it becomes an asset.

"NOW, in this mobilization of the people of the United States we are going to jar their habits. Business houses are not going to be able to do as they used to do, many ways; workers in industrial establishments, farmers who are tilling their fields, everybody is going to be asked to give up, or, at least, to permit the temporary obstruction of some of these deeply imbedded habitual modes of action and thought, and, as a consequence, we are all going to be in a more or less disturbed state of mind; things are not going to be as they usually are, and so our minds are going to be filled with questions as to whether the things which are in an unusual state are in a right or a profitable state.

"SOME of the reorganizations and readjustments in trades are going to be quite fundamental and profound, and the disturbance of the line of habit and normal business is going to be exceedingly unusual and difficult of rapid adjustment America has a chance to match her wits against the wisest people in the world now. Our inventors who have loaded the Patent Office from garret to cellar with the most brilliant manifestations of ingenuity that the human mind has ever seen, in times of peace and pleasantness, are now summoned to do their very best in order that American ingenuity may be contributed as a great national asset. Our industrial captains, and our great commercial people, our farmers, all of us from the most important to the least of us in all trades and occupations now have an opportunity to put our hands on the rope that is pulling civilization out of the fire.

"THE question of organizing an army without disorganizing industry is an exceedingly difficult question. When you talk of withdrawing a million or a million and a half men from the ordinary pursuits of peace, without dislocating our industrial and commercial processes, you have a hard problem."

Billion for War in Air?

Senate Committee Begins Hearings on Bill Authorizing Huge Sum

Coffin Warns People Real Effect to Come by Airplanes

WASHINGTON, D. C., June 15—The United States may spend $1,000,000,000 to fight war in the air. Already the Senate Committee on Military Affairs has appointed a subcommittee to begin hearings on a bill of Senator Morris Sheppard of Texas to establish a Department of Aeronautics. The decision of the committee to begin hearings on this measure is taken to mean that a strong administration sentiment in favor of this radical step exists. Senator Sheppard's bill provides an appropriation of $1,000,000,000 for carrying its provisions into effect. Should the bill become a law, a secretary of aeronautics would be appointed as a member of the Cabinet.

General George Owen Squier, who directs the Nation's aviation service, advocates an overwhelming aerial fleet and in speaking of the airplane program which, if passed by Congress, will involve some $600,000,000 in the beginning, says:

"Airplanes are the logical fighting machines for Americans because we are an imaginative people, and when our imaginations strike fire nothing can stop us. We are impatient of plodding methods, a Nation of individualists. We are willing to send our hundreds of thousands to the front if needs be to dig holes and burrow in the soil for interminable months, but we don't enthuse over the idea. We want something that appeals to our knack of inventing things, for getting over obstacles in an original way. And the air way is our way.

Dependent on Aviation

"The modern type of land war is dependent upon two things above all others—aviation and artillery. They are co-operative elements in a fighting army, and against an enemy a flying machine is a terror and a menace to big guns. That airplanes are positively essential for directing artillery fire is an axiom among military men who have seen action in the sort of battles being fought on the western front."

In a statement by Howard Coffin, chairman of the aircraft production board of the Council of National Defense, the American people are warned that they must be prepared to enter the war in the air to an extent hitherto unthought of if their power is to have any real effect on the result of the war during the next year. The American authorities have been informed by the British and French that if the United States will supply them immediately with airplanes and aviators commensurate with this country's manufacturing resources it unquestionably will contribute more to the success of the Allied cause and the defeat of Germany than the sacrifice of thousands of American lives on the western front later on.

Great Britain's last appropriation for aircraft alone was $600,000,000. Her appropriation for the present year probably will approximate a billion. France has spent an equal amount on her air program. The United States, in the face of the existing situation, cannot afford to be niggardly, says Mr. Coffin.

REO TRUCKS REQUISITIONED

Lansing, Mich., June 16—The United States Government gave compulsory orders for ¾-ton trucks to the Reo Motor Car Co., this week, for shipment to Tacoma, Wash., where one of the biggest of the Government's war enterprises is now in full swing. The reports from Tacoma show that the Government has acquired a vast acreage along Puget Sound. These quarters must be in shape by Sept. 1, when 40,000 men will be centered at this point. Other requisitions by the Government received by Reo this week were for trucks for Fort Snelling and Fort Sheridan.

NEW TRACTOR-TRUCK

Lapeer, Mich., June 18—The Lapeer Tractor-Truck Co. has placed on the market a tractor-truck, in two models, with Waukesha four-cylinder 3½ by 5¼ in. engine selling for $1,900 and $2,000.

The 2- and 3-ton type is furnished as a complete tractor with a cab and trailer without the body for $1,900 and the 3½- and 5-ton model, which includes the complete tractor with the cab and trailer without the body, is $2,000.

The tractor-truck engine has a separate head, three point suspension, block-cast cylinders and three main bearings.

NEW SUPERHEATED MANIFOLD

Superior, Wis., June 18—J. G. Barnsdale, chief engineer and general manager of the Continental Motor Truck Co., Superior, Wis., which is completing work on its new plant, has perfected a new design of superheated manifold, combining intake and exhaust pipes, for motor vehicles, making the use of kerosene and the heavier distillates of petroleum possible without ordinary carbureter. The first design is one for Ford cars and in exhaustive tests it has been found that a car of this kind not only will travel 10 m.p.h. faster on kerosene than on ordinary gasoline, but 10 m.p.g. further. The plan of the device differs radically from those designed for gasoline. Instead of spraying the fuel into the cylinder, the Barnsdale device holds the kerosene in the manifold until the heat has vaporized it, and it then passes into the combustion chamber. The new manifold will be marketed by the Superior Manifold Co., controlled by Mr. Barnsdale, and will be made in the new truck plant. Patents have been applied for.

Aerial Schools Centered

France Builds World's Biggest Aviation Field and Concentrates Facilities

American Students Uncertain as to U. S. Corps Standing

PARIS, France, May 1—The greatest aviation training school perhaps in the world has now been started somewhere in France, many of the other big schools throughout the country having been brought to this point so as to have the schools for teaching flying with the different machines all together. The schools located at this point are Farman, Voisin, Caudron, Nieuport, Schmidt, Bleriot, Catterone and Breguit. Practically every airplane used on the front has its school at this point, where all classes of work are taught except acrobatics. The Nieuport machines are the only ones used in acrobatic work, and the school for this is located at another point in France.

It is a most interesting place where all these great airplane schools are located. Here the aviators are taught everything in connection with planing, including all kinds of repairs for planes and motors, night flying, bombing, photography, observation, etc. There are very extensive repair shops nearby, where complete construction in all kinds of motor and plane repair is given. It is necessary when reaching your school in the morning to go a great many miles by motor truck, after which there is a long walk.

Many Americans connected with these French aviation schools are wondering what will be their status now that the United States has entered the war. Some of these aviators have good rank in the French army, and they are wondering what their standing will be in the United States corps. Many of the Americans would prefer to remain with the seasoned French aviation officers.

OWNERS' PATRIOTISM ABUSED

Chicago, June 18—Many patriotic dealers and private car owners who have volunteered their cars for such service as they can give the military and Red Cross forces have found that service not what it seemed to be. They have found imposition in many cases, and this may explain the withdrawal of some of the many offers made in the first heat of the declaration of war.

Probably those behind the organizations asking the enlistment of cars of dealers and private owners in transporting soldiers, Red Cross supplies and so on, in the seemingly unending calls for motor aid in these days of preparation, do not sanction the abuse of the offers made. The offers are abused, however. A dealer sends his brightly polished, unscarred demonstrating car to headquarters for patriotic use. He

learns when he gets it back that it has been used for joy-riding in many cases, and the joy-riders have scratched the finish, marred the cushions and in other ways showed no appreciation of the courtesy.

Meetings of dealers have been called in various cities by citizen committee leaders to ask the use of cars. The dealers are willing to do their share in emergencies but are not willing to bind themselves to supply machines except when real necessity arises. As one dealer expresses it, he cannot see his way clear to placing a car and driver at the disposal of Captain Jinks to send his orderly after his laundry; for Colonel Kink to go to the tailors to be measured for a new uniform; etc., when he needed the car for demonstrating purposes.

One Boston woman placed her car at the disposal of the Red Cross, and she was ordered to report at 9 one morning. She did. She was sent to a suburb to take a family to a hospital. The patients decided not to go that day. On reporting this she was sent to another suburb to get another patient. She took a woman and child to a hospital and was told to go after them later on. She did so, only to learn that the woman was down town shopping but would be back later. She took the child home and then went home to send a letter to the committee to tell them she was too busy to continue that work. She felt that someone was being imposed upon and she did not propose to drive around those who could go shopping and use street cars.

BUICK SIX AT $1,385

Flint, Mich, June 16—The Buick Motor Co. has brought out a new six-cylinder, seven-passenger car carrying a three-point suspension block engine of 3⅜ by 4½ in. bore and stroke in a 124-in. wheelbase chassis and selling for $1,385. It has left drive and center control. The engine is said to develop 60 brake horsepower and has light pistons and connecting rods. The valves are large and mounted in readily accessible cages in accordance with the Buick overhead valve construction. Oiling is by circulating splash, and cooling, which is by pump, is thermostatically controlled. The electric system is a Delco single-unit type.

The clutch is a special multiple disk dry plate, and gearset is three-speed selective. The rear axle is a Weston-Mott floating design carrying the entire load on the housing, with the differential mounted on large Timken roller bearings. Drive is by inclosed shaft with a single self-oiling universal to spiral bevel gears. Service brakes are internal contracting. Timken roller bearings are used in the front wheels. Rims are demountable and tires are 34 by 4½ straight side.

The rear springs are the special Buick floating cantilever type with semi-elliptics in front, aided by shock absorbers. The equipment includes one-man type top, rain-vision windshield, speedometer, clock, horn, lamps, etc.

Packard Contest Ends

St. Louis, Omaha, Youngstown and Phoenix Carry Off the Honors of Sales Race

Arizona Firm Sells 350 Per Cent of Its Quota

DETROIT, June 18—St. Louis, Omaha, Youngstown, Ohio, and Phoenix, Ariz., won the Lincoln Highway Sweepstakes, the national sales contest of the Packard Motor Car Co. The contest started Feb. 22, and the cities having Packard dealers or branches were divided into four sections. St. Louis won with 115 per cent of her quota sold. The St. Louis territory is controlled by the Packard-Missouri Motor Co., of which W. J. Parrish is president. Kansas City is included in the territory. Detroit was second in Division A, which is composed of the largest cities, with 103 per cent; Cleveland, third, with 102 per cent; Philadelphia, fourth, with 100 per cent.

The Orr Motor Sales Co. of Omaha sold 200 per cent of its quota. The next four in division B are: Washington, 147; Seattle, 144; Indianapolis, 127; Atlanta, 113.

In Division C H. S. Thorne of Youngstown sold 300 per cent of his quota. San Antonio was second with 175; Montreal, third, 150; Denver, fourth, 128; Louisville, fifth, 125.

McArthur Bros. of Phoenix made the highest mark in the entire contest with 350 per cent of their quota sold. They are in Division D and the other leaders are: Fort Wayne, second, 266; Texarkana, third, 233; Saginaw, Mich., fourth, 150; Altoona, Pa., and Elmira, N. Y., fifth, 133 each.

Individual Winners

Trophies for individual salesmanship did not go to the cities with the highest collective showings. The master salesmen, with their scores, are: Division A, F. J. Peterson, Cleveland, forty-eight; F. C. Sibbald, Cleveland, thirty; C. E. Holzkamp, New York, twenty-seven.

Division B—A. S. Blair, Baltimore, twenty-one; H. C. Berg, Seattle, nineteen; D. H. Luttrell, Washington, nineteen.

Division C—E. W. Travis, Youngstown, twenty-three; R. C. Lemm, Denver, twenty; W. R. Hicks, Montreal, eleven.

Division D—A. R. Dearborn, Phoenix, thirteen; M. D. Cubbage, Fort Wayne, eight; B. N. Anthony, Texarkana, seven.

PACKARD DEALERS SAIL

Detroit, June 18—More than 600 representatives of the Packard Motor Car Co. with their families, left Detroit to-day on board the Steamer Noronic for a three-day cruise. The Noronic will carry the dealers and their wives through several of the Great Lakes and return here Thursday morning. These dealers were the winners of the Lincoln Highway Sales Sweepstakes conducted by the Packard company. Final conclusions of the sweepstakes will be announced on the cruise and the winners will be awarded hand-carved hall clocks.

Department managers of the company have placed thousands of dollars' worth of exhibits of new models of cars and trucks on the main deck. Appropriate decorations have been installed, and the large dance hall on the ship has been converted into a convention hall.

PERMALITE IN CONSOLIDATION

Indianapolis, Ind., June 15—The Permalite Corp. of Indianapolis and the W. L. Battery Co. of Poughkeepsie, N. Y., have consolidated and will be known as the Permalite Storage Battery Co., Inc. Offices will be maintained both in Poughkeepsie, where the batteries will be made, and in Indianapolis. The company is establishing depots over the country for the exchange of its batteries under a distribution plan which permits a Permalite user to exchange his battery as often as necessary for a perfect, fully charged one at a standardized fee, which amounts to about the same as a charge. The manufacture will be under the supervision of W. R. Wright, formerly with the W. L. Battery Co. and a pioneer in the business.

ROSS TO REORGANIZE

Detroit, June 15—Plans are being perfected for the reorganization of the Ross Automobile Co. John L. Ross is to take an extended vacation, and H. D. Mackaye is now general manager. The company will adopt a new policy, which is to do no manufacturing, discontinue models K 25 and A and assemble only model C, the Ross eight. New officials of the company will be announced soon.

Beginning Monday, June 18, the Ross Automobile Co. will have ready for sale to best bidder approximately $75,000 worth of Model A and Paige 25 parts and several complete cars.

TO SELL GIBNEY PLANT

Philadelphia, Pa., June 16—An offer has been made by the Fisk Tire & Rubber Co., for the purchase of the Gibney Tire & Rubber Co., of Conshohocken, Pa., now in the hands of a receiver. It is reported that at least two other concerns of national importance have made offers. There is reason to believe, however, that the company itself will make an offer and that it will be higher than the rest. The bids will be submitted to the U. S. District Court in this city about June 25, and final adjudication will be made July 10.

CHALMERS TESTS ACCELERATION

New York, June 16—Official figures are released by the A.A.A. contest board on a Chalmers acceleration test. June 9 W. F. Sturm, contest manager for the Chalmers factory, conducted the trials on the Con-

course. Joe Dawson did the driving. The car used was a five-passenger stock taken from the floor of the local branch the morning of the trials. That there might be no discrepancy in the relative speeds at the different points, from four to eight trials were made for each distance attempted. The Chalmers went from a standing start to 33.3 m. p. h. in 10.2 sec.

The regular stock equipment was carried on the car. The top was down. U. S. Royal Cord 32 by 4 tires were used.

465 MILES ON HIGH GEAR

Boston, Mass., June 16—A swing around New England of 465 miles, all on high gear without stopping the motor, and doing it between dawn and dusk, was the endurance run made by the first Dodge Bros. car ever delivered in New England. It was made to show the flexibility of the four-cylinder engine. The start was made at 3 a. m. with four persons in the car, C. S. Henshaw, Dodge Bros. dealer; J. H. Keene, the driver; W. L. Shepard, a salesman, and James T. Sullivan, of the Bay State A.A. as observer. The low and intermediate gears were chiseled off the shaft.

From Boston the car went down through Newburysport to Portsmouth, N. H., then over to Kittery, Me. Retracing the trip the run continued back through Massachusetts and into Brattleboro, Vt. There the chief of police refused to allow the motor to be kept running, so it was stopped a few minutes while the party had coffee and sandwiches.

Then the run was back through Massachusetts and down to Putnam, Conn., and across to Woonsocket, R. I., making that the turning point for Boston. The last mile was reeled off at 8:30 in the evening. No attempt was made to create a speed record. The car averaged 19.5 m. p. g. Not a stop was made for mechanical trouble, and one tire puncture was recorded. The car had traveled 35,000 miles before making the test, and a year ago it made the run on high gear through Crawford Notch to Bretton Woods and back in a day.

OLDS RAISES PRICES

New York, June 18—The Olds Motor Works, Lansing, Mich., will raise its prices $100 on all models July 1. On that date the eight-cylinder model will be listed at $1,395 for the five-passenger, $1,467 for the seven, $1,395 for the club roadster. The five-passenger six-cylinder model and the two-passenger roadster will be listed at $1,195.

JORDAN BUSINESS INCREASES

Cleveland, Ohio, June 15—The shipments of the Jordan Motor Car Co., during May amounted to 287 cars, making the total of Jordan factory sales to date $2,703,750. The orders on hand June 10 for immediate shipment were 236. Of the 2000 cars planned to be built before Sept. 1 at a maximum rate of ten a day 1545 have been shipped.

To Standardize Aircraft

Makers' Association Hears Report That 2500 Planes Can Be Made at Once

Patents Committee to Select Ideas and Safety Patents

NEW YORK, June 16—The Aircraft Manufacturers' Association decided to undertake the work of establishing its own standards for the aircraft industry in coöperation with the Society of Automotive Engineers at a meeting held here this week. The entire technical staffs of the manufacturers in the association have been placed at the disposal of the standardization committee and the S. A. E. will be invited to have representation on the committee, which will proceed with its work at once.

The materials committee reported that supplies on hand at the factories are sufficient to produce 2500 airplanes immediately, these comprising 4,000,000 ft. of air-dried spruce and 3000 yd. of Irish linen for wing and fuselage covering. The committee also reported that the efforts of the association have overcome difficulties hitherto exprienced in the transportation of materials and the delivery of finished products from the allied trades. The association has established an industrial directory covering the fields supplying raw materials and finished products to the aircraft industry.

Advanced ideas in the aeronautics and several safety devices are under consideration by the patents committee which will select those best suited to immediate requirements and place them under development.

A letter was received by the advisory committee from Howard E. Coffin, chairman of the Aircraft Protection Board, stating that there is no intention to concentrate the aircraft industry in Detroit and urging the closest possible relations between the board and Aircraft Manufacturers' Association. The advisory committee has been in consultation with authorities at Washington and the members have made frank statements of their ability to produce airplanes in quantity. The manufacturers are only awaiting the action of the Government in ordering some of the 3500 airplanes it is planned to build before next spring to go ahead on quantity production.

The aircraft industry can produce with its present equipment based on piece time operation five types of machines. While the manufacturers prefer to make their own types of machines in the greatest possible quantities and at the same time to carry along the development of the training type plane based on those in use by the allies in Europe, they expressed their willingness to set aside for the present their equipment suitable for regular production and concentrate on the training machines which are needed immediately and then to follow later with their own types if desired.

The Society of British Aircraft Constructors is desirous of working in close coöperation with the Aircraft Manufacturers' Association as set forth in the communication read at the meeting. The British society is composed of practically every British constructor of aircraft or aviation engines and by affiliation with the American Association renders available first-hand information based on actual observation developed from experience in the field and viewed from a manufacturers' standpoint. Although the aircraft industry in England was far inferior to the present state of the industry in America at the beginning of the war, the output of finished planes is now about 800 a week. The manufacturers engaged in this work have a capitalization of $375,000,000. The industry in America has a capitalization of about $20,000,000 and based on a time equipment can turn out in three months one-fifth as many planes as England with her experience of 3 years under war time conditions.

The Hall-Scott company was elected a manufacturing member of the association with H. T. Whitaker as representative.

One feature brought out very clearly at the meeting is that the aircraft industry in this country has passed beyond the experimental stage and is on the threshold of a great development.

WHITE EMPLOYES SUBSCRIBE $200,000

Cleveland, Ohio, June 18—Over 3,500 out of 4,800 employees of the White Motor Co. have subscribed an aggregate of $200,000 to the Liberty Loan. The company itself has subscribed $500,000 to the loan.

JOHNSON INCREASES WAGES

Racine, Wis., June 19—For the second time this year S. C. Johnson & Son have announced a voluntary increase in wages throughout the entire organization. The payroll includes 250 men and women.

FORD PRODUCTION FOR MAY

Detroit, June 15—The Ford Motor Co.'s production for May is 83,616 cars, which is an average of 3,216 a day, or better than two cars a minute. May 19 was the biggest day in the month, turning out 3496 cars. Ford also is making 2500 ambulances for the United States government.

AJAX MAY EARNINGS $319,588

New York, June 15—Net earnings of the Ajax Rubber Co. for May were $319,588, or at the rate of $3,835,044. For the 5 months ended May 31 net earnings were $1,102,684, or at the annual rate of $2,646,444. The returns for May were the largest in the history of the company for a similar period. For the 5 months the

company earned $7.76 a share on its stock, or at the annual rate of $18.60 per share.

At a meeting of the board of directors last Tuesday it was decided to appropriate $450,000 for improvements, additions, etc., in order that the capacity of the plant may be increased. The company is now over 100,000 behind its deliveries of tires and tubes. Less than 3 per cent of the tires manufactured by the Ajax company go to the manufacturers, the rest being sold direct to the public.

The company has also decided in favor of buying $100,000 worth of Liberty Loan bonds. This is in addition to $30,000 or $40,000 subscribed for by employees of the Ajax company.

COLUMBUS PLANS RACE TRACK

Columbus, Ohio, June 15—With preliminary plans completed, the Columbus Motor Speedway & Horse Racing Co., new entry in the racing field, is ready to renew its financing campaign. The company has an authorized capital stock of $200,000, all common, and proposes an addition of $300,000.

The proposed project is a combination speedway, two race courses and a steeplechase course. The location selected is west of the city. From the viewpoint of accessibility and facilities to handle large crowds, the location is regarded as ideal. The 200-acre-tract is 3 miles from the center of the city, is reached by two street car lines, several paved streets, several well-graded pikes from the surrounding country, a steam railroad and two interurban lines.

The latest type of construction for places of this kind is planned. One grandstand, overlooking all the courses, will be erected, with subways leading to the field, thus eliminating danger during meetings.

OMAHA HAS 15 ENTRIES

Chicago, June 18—Signing up of fifteen entries by Phil McShane of the Omaha speedway at the Chicago race last Saturday assures Omaha of the race on July 4. The opinion had been voiced that the Chicago race would be the last big race this year, but Omaha is going ahead and expects to add materially to the number of entries obtained so far.

There will be two events, one for 150 miles with seven prizes, totaling $8,000, and one of 50 miles with four prizes, totaling $2,000. Entries close at midnight June 29. The entry list at present includes:

Car	Driver
Hudson	Mulford
Hudson	Vail
Hudson	Unnamed
Mercer	Thomas
Mercer	Haines
Mercer	Unnamed
Duesenberg	Milton
Duesenberg	Henderson
Duesenberg	Hearne
Frontenac	Chevrolet
Omar	Toft
Olson Spec.	McBride
Detroit Spec.	Buzane
Pan-American	Alley
Ogren	Henning
Hoskins Spec.	Lewis

Airplanes for Business

Wider Radius of Practical Use as for Motor Cars Is Foreseen

Standardization of Parts is Criticized as Premature

INDIANAPOLIS, IND., June 16—Dr. Tobias Dantzig, instructor of mathematics at Indiana University, and a graduate of the Aeronautical Institute of Paris, discussed the subject "The Future of the Aeroplane and the Principles of Aeroplane Construction" before the Indiana section of the Society of Automotive Engineers at the Claypool Hotel last night. The meeting, which was the last of the year, was attended by the largest crowd in the history of the Indiana section. Officers for next year were elected as follows:

Chairman, F. A. Cornell, assistant general sales manager of the Cole Motor Car Co.; vice-chairman, Charles S. Crawford, chief engineer of the Premier Motor Corp.; secretary, Frank E. Smith of the Universal Motor Products Co.; treasurer, C. E. Jeffers, designing engineer, Nordyke & Marmon Co., and the fifth member of the board of directors, F. E. Moskovics, commercial manager of the Nordyke & Marmon Co.

Doctor Dantzig in his talk on airplane construction displayed two airplane models—one a Curtiss biplane military tractor and the other a monoplane patterned after the German type. He spent considerable time in French airplane factories, and he told of the general principles adopted there for the construction of military machines.

After explaining the mechanical features of the two models, Dr. Dantzig attacked the proposal of American engineers to standardize airplane parts, and this attack was the subject of much subsequent discussion.

"I am opposed to the proposed standardization of aeroplanes," he said. "The aeroplane may be said to be just beginning to enter a stage of productive evolution, and to seek to standardize the parts now would mean that future development would be retarded greatly.

"What would have happened to the automobile industry if parts had been standardized in the beginning? The development would not have been nearly so rapid. It would be a mistake to standardize aeroplane parts at this time, when no perfect mechanism for construction has been developed scarcely except the adopted mechanism of control. Standardization at this time would retard the development of the aeroplane.

"Aeroplanes are to have a wider radius of practical use than for mere sport and pleasure, just as the motor car has been developed into a commercial vehicle. Aeroplanes will be used for carrying passengers and mail and for exploring parts of the world of which we know little.

"It is not my belief that aeroplanes ever will be used for the transportation of freight. This would not be practical from an engineering standpoint. It is true that twenty machines carrying one passenger each will expend less fuel than one machine which is made to carry twenty passengers, thus showing that it would not prove practical to fly with freight.

"The automobile industry is the one industry to develop the aeroplane. Motor car factories may easily be converted into aeroplane factories and, as far distant as such a policy may seem now, it is very probable that many automobile plants will be converted into aeroplane factories in a few months if the demands of the army and navy are to be met. Automobile engineers should begin now to study flying problems—you may need the knowledge much sooner than you expect."

Doctor Dantzig urged the Indiana automotive engineers to attempt to have a branch of the Aero Club of America established at the Indianapolis Motor Speedway, which he declared fitted admirably for that purpose.

Following the address, Charles C. Crawford, chief engineer of the Premier Motor Corp., entered into a discussion of Doctor Dantzig's remarks opposing the standardization of aeroplane parts.

"I don't think Dr. Dantzig understands this proposal to standardize aeroplane parts," Mr. Crawford said. "Such an action is necessary now to meet war-time requirements and even in peace times, the standardization of parts would not retard development. Automobile parts are standardized, that is, we have accepted principles on which to work for a time, but despite this we are all constantly working for something better and when we make an improvement it is adopted as a part of the standardization. The development of the automobile has not been retarded as a result of standardization."

CLEVELAND SECTION

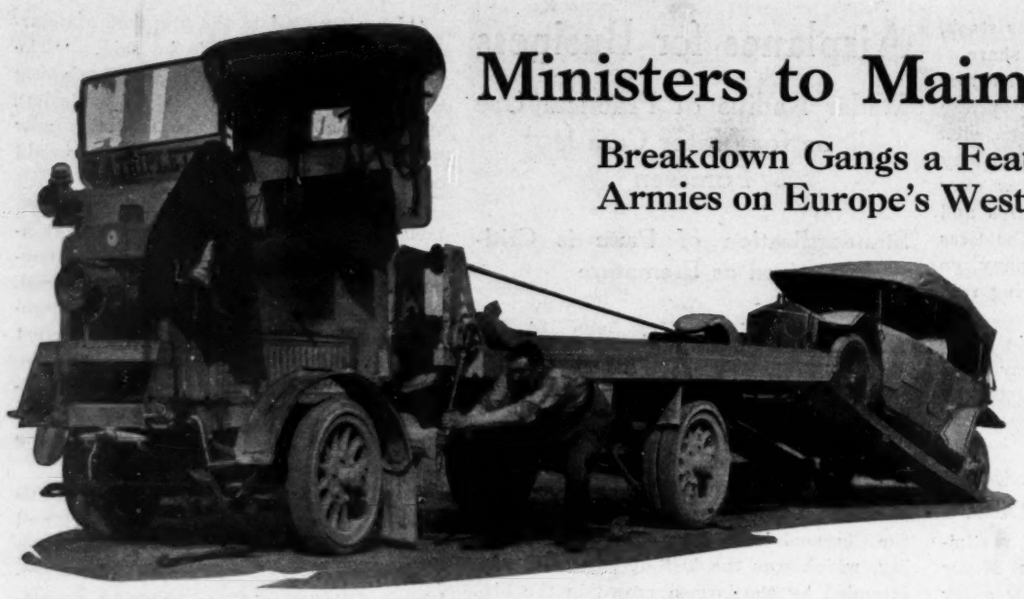
CLEVELAND, OHIO, June 15—The main paper at the closing meeting of the Cleveland Section of the Society of Automotive Engineers was read by E. H. Sherbondy of the Peerless Motor Car Co. on "Aviation Motors with Particular Reference to the Benz and Mercedes Type," which will be reproduced next week.

The meeting was preceded by a dinner at the Statler Hotel. Moving pictures of White trucks in action on the Mexican border and in road building operations at Pike's Peak were shown.

The following officers were elected for next year: Chairman, W. R. Strickland, of the Peerless Motor Car Co.; vice-chairman, A. M. Dean, Ferro Machine & Foundry Co.; secretary, A. G. Welfare, National Carbon Co.; treasurer, H. C. Snow, Winton Motor Car Co.

Ministers to Maimed Motors

Breakdown Gangs a Feature of All Armies on Europe's Western Front



How the wrecked cars are loaded for transportation to repair bases

By W. F. Bradley

EDITOR'S NOTE—Meeting emergencies that frequently put motor equipment along the allied front in Europe out of commission has been one of the big problems of the war. The greatest efficiency of the motor equipment is contingent upon the greatest possible continuous service. This story, as told by W. F. Bradley, Motor Age's special war correspondent in Europe, pictures what breakdown gangs have meant to the armies and how they have extended the usefulness of all motor equipment through carrying the repair shop to the maimed car wherever possible.

MOTOR car breakdown gangs are a regular feature of all the armies now working on the Western front in Europe. The crews are obtained from the men attached to the traveling workshops which accompany all convoys on active service. These workshops, which are established at some convenient position in the rear of the lines, are entirely motor-hauled. Machine tools are mounted on four-wheel trailers, each tool having its own electric motor and receiving current from the parent machine of the group.

It is not expected that truck drivers shall be capable of making more than simple adjustments. Each convoy has attached to it one or more mechanics specially trained to discover and repair the cause of breakdowns. In cases of extreme urgency, as when an important attack is in progress, orders are sometimes given that no repair work must be done on the roadside. If a truck is stopped and cannot be got going within 5 min., it must be pushed off the road and abandoned until there is opportunity for attending to it. This is only done, of course, where available roads are few and any blockage would be detrimental to the interests of the army. In most cases if the driver cannot get going, he drives or pushes his machine as far as possible to the side of the road and sends in a message to the breakdown gang at the repair station. Military police have instructions never to allow any car to block the traffic. In this respect they are more particular than are the police in the world's capitals.

As far as possible the breakdown gangs get the machine going again under its own power. Frequently, however, this is not possible, and the entire machine has to be carried home. In the French army breakdown gangs make use of 5-ton trucks with the driver's seat over the engine and a specially big platform body. This truck is provided with a power-driven winch and a hand-operated capstan at the head of the platform body so that any damaged car can be hauled up an inclined plane.

Rescuers Must Be Ingenious

Many of the rescue jobs call for much ingenuity on the part of the crew, and are not always carried out without danger when the roads are under fire. The Italians have one type of tractor with an overhead crane capable of lifting 5 tons, which has proved invaluable in difficult rescue work. It can lift a touring car or ambulance bodily out of a hole or from the foot of an embankment and place it on solid ground. For this class of work an overhead crane, which can be demountable and need not interfere with the ordinary work of the truck or tractor, is certainly preferable to the more commonly employed winch placed on the rear of the chassis.

On one occasion a driver of a 2½-ton truck crossing a pontoon bridge over the Isonzo river under fire, became scared when a shell burst directly overhead and drove his truck right off the bridge into the river. It fell on its wheels with only the top a few inches above water. A tractor with crane was brought along and hauled the wreck out of the river. The work had to be carried out as quickly as possible, for the bridge was only wide enough for a single vehicle and was one of the main approaches to an important position.

Hauling a British ambulance on to the breakdown truck

Approaching a temporary frontier bridge at a dangerously high speed, an Italian staff car driver running without lights became confused and shot over the sides into the river 150 ft. below. The three officers and driver were killed and the mechanic washed away by the stream. Although the banks were almost perpendicular, the wreckage had been taken away by noon the next day.

The most difficult jobs are heavily loaded trucks with broken stub or rear axles. The writer witnessed a smart piece of work when a loaded 3½-ton truck broke its rear axle. The accident happened at nightfall on a crowded road frequently under fire. As traffic generally thinned down after midnight, the mechanics on the convoy to which this truck was attached decided to carry out the repair themselves. After the load had been transferred to another vehicle the back of the frame was jacked up and propped up with timber taken from a wrecked house. The wheels were taken off, chain cases removed, for the truck had inclosed chain drive, and finally the axle

The illustration above shows a Pierce-Arrow truck in difficulties on the way to the Vosges front. Below is a Pierce-Arrow truck, the victim of an accident on one of the roads behind the French lines

taken down. For three or four hours the truck stood on the road with nothing but a few props to support it, while the mechanics were bringing up another axle. This was put into place and the truck was driven away under its own power by daybreak. All the work had to be done in complete darkness.

Within a few yards of the same spot the writer was the victim of a similar accident. While driving a loaded ambulance in dense traffic and heavy rain one of the differential shafts broke just back of the taper on which the wheel was fitted. It being impossible to carry out any repairs at the time, the wounded men were lifted into the first empty ambulance which happened to pass, and with the aid of friendly soldiers the wrecked car was dragged as far as possible into the muddy ditch by the side of the road. Without mechanical aid it was impossible to get the car right off the road, and as no lights were allowed at this point, it was hoped that no other vehicles would collide with it.

At daybreak a 3-ton truck brought up a Buick axle with double wheels. After considerable labor the ambulance—an English make—was jacked up and the broken axle removed. While the frame was being carried on props the Buick axle was put underneath and the wheels replaced. The props were then taken out and axle and frame lashed together with rope. As no brakes were available and the wreck had to be towed 12 miles, a stout prop was lashed between the front axle of the ambulance and the rear cross frame member of the truck in such a way that it would prevent the ambulance running into the

Cars parked in streets of Peronne immediately after its capture by the British. The effects of German-Allies' crossfire is evident

truck yet not interfere with turning movements. In this way the ambulance was towed home safely. Within three hours of getting away from the scene of the accident, the house which had supplied most of the timber, and by the side of which the salvage work had been carried out, was hit by an 11-inch shell and razed to the ground.

Comparatively few cars are completely destroyed by direct hits from the enemy's guns, though many suffer minor damage. The writer was driving on a road near Gorizia, Austrian territory, when immediately after passing a standing truck loaded with timber the familiar whistle of a shell was heard. From the concussion it was evident that the shell had exploded on the road but a few yards to the rear, but it was not politic to stop and make inquiries. Returning over the same road a quarter of an hour later, it was seen that a 6-in. shell had dropped in the center of the load of timber and completely dispersed it. The body, steering wheel and column, engine hood, etc., were a complete wreck, but the big load of timber had prevented the chassis receiving any real damage. After picking up the tools and spares which were scattered over a radius of 50 yd., the truck was towed home by another vehicle from its own convoy. The driver and mechanic having gone into a house to ask for labor in unloading the truck escaped without a scratch.

Such luck does not always attend drivers. One of the Fords used by the American ambulance near Verdun received a direct hit from an enemy shell. The wreckage was so complete that convoys passed over the spot all night without realizing that anything had happened. It was only when the driver and his mechanic were reported missing and a search was made that their remains and some wreckage of the car were discovered.

Disabled and wrecked machines are never allowed to remain long in the war zone. In the first place they are an obstacle to traffic, and secondly there are always some parts worth saving, and which would be stolen by drivers if the army did not collect them. During times of stress the wrecks may be allowed to lie for a few days or a week, but immediately the severe fighting is over breakdown gangs are sent out to gather up the wreckage. Sometimes a road will be closed to all traffic for a few hours in order to give the breakdown gangs a free hand, for it is obviously difficult to get big cars and trucks out of the ditches if normal traffic has to be maintained at the same time.

Lorraine-De Dietrich truck overturned with Packard standing by

HOW GOOD ROADS SAVE

Austin, Tex., June 15—D. E. Colp of San Antonio, secretary of the Texas Good Roads Association, has been making tests to show the economy of improved highways in lessening the cost of operating motor vehicles. In this work he was assisted by experts of the United States Government. The post road between Austin and San Antonio was used, and a census taken in February by the United States showed the daily average of 931 cars. This 931 was multiplied by 30 to give the average monthly traffic and shows 27,930, or 335,160 for a year.

Before the road was improved it took an average of 8 gal. of gasoline for the trip. This has been reduced to 5, which, at 22 cents—the price when the census was taken—means that the saving was 1,006,380 gal., or $221,403.60. It was necessary to estimate the saving on oil and tires, and this is $20,000 for the former and $127,000 for the latter, bringing the total saving on these three items to $368,403.60 for one year.

The total cost of constructing this road was $239,800, which means that the saving in one year was $128,603.60 more than the cost of the road.

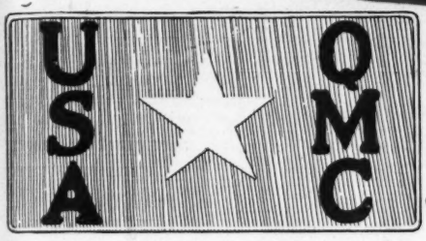
These figures are especially pertinent just now with the state highway department formed and the state law requiring a minimum license fee of $7.50 on motor cars, effective July 1. It is estimated that this fee will bring into the highway fund approximately $1,360,000 annually, half of which is returned to the counties from which it came to be used for road maintenance, while the balance, aside from about 8 per cent required for administrative purposes, will be used for road construction and maintenance.

A French motor ambulance that missed its footing. It is such instances as these that make the breakdown gangs necessary

REPUBLIC PRICE INCREASE

Alma, Mich., June 18—The Republic Motor Truck Co. has advanced the price of its ¾-ton truck $100 and will advance all other models as soon as the costs are definitely estimated.

You'll See More of This Tag



AT the left we have with us one of Uncle Sam's official license tags, more of which you will see later, while above is the official car which claimed this particular tag, one used on the punitive expedition into Mexico. Reading from right to left, the officers are Major-General J. J. Pershing, Colonel DeR. C. Cabell, chief of staff, Major Hines, adjutant, and Lieutenants J. L. Collins and G. S. Patton, aids-de-camp. General Pershing's chauffeur on the expedition, S. S. Burgey, is at the wheel.

Already other cars are carrying this license insignia to other foreign countries; still other cars are abroad in our own fair country with this, or similar, official tags. The Government has asked for bids on both touring cars and roadsters in lots of from 1 to 1000. The bids on passenger cars were opened June 8. Inquiries are being made for at least 10,000 cars to be ordered promptly, and the bids to be opened will call for 40,000 cars to be furnished as asked for. About 100,000 cars, motor trucks and motorcycles will be required.

Four men have been appointed chauffeurs with General Pershing in France, namely, John J. Jennings, George Limthicum, Elgin Brain and Ray Middleton. Eddie Rickenbacher is to be General Pershing's chauffeur. And the Army officers are recruiting chauffeurs for the forces in general. Already men of our country are training. Who would not drive a car with a tag similar to this?

English Motorists Restricted

LONDON, England, May 15—The effects of the war are being experienced very keenly by the private motorist in England who has been operating under severe restrictions for the last year. The amount of gasoline allowed the motorist has been regulated by the government for many months, and it is expected that beginning with June 1 pleasure motoring in Great Britain will cease to exist, as all privately owned cars will be laid up until the end of the war because of the fuel situation. A second series of gasoline licenses were issued at the commencement of last November which serve for a period of six months, thus expiring May 1. When May 1 arrived no licenses were issued except for cars whose work was absolutely of national importance, so that the private motorist who could not be counted in this class had no gasoline excepting what he had saved out of his meager allowances during the last six months. Even those who had a full business claim for gasoline have not been receiving more than a third of their former allowances, and motor trucks have had their allowances cut more than 25 per cent. This 25 per cent cut applied also to motor buses and public service vehicles.

Substitutes Are Prohibited

Recent interpretations of the law restricting the use of fuel for motor cars has declared that the private motorist cannot use benzol, kerosene or any other substitute for gasoline.

Quite a number of motor trucks in certain counties outside of London have been operating with a fair amount of success on coal gas, which is compressed in a large tank carried on the roof of the truck or bus. The cost of coal gas is said to compare favorably with that of gasoline, but the general use of this fuel is not possible because every local authority has the power to stop the running of any type of vehicle with which it does not agree. It is not expected that any great use of coal gas will be made.

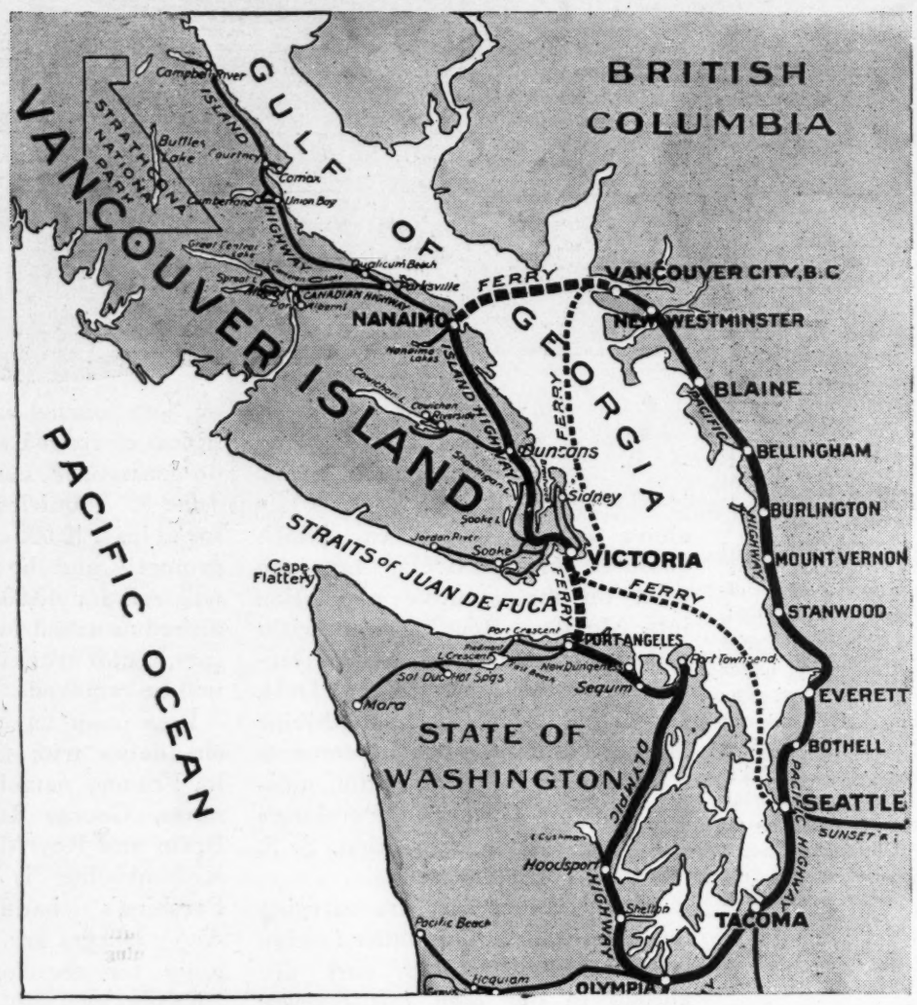
The restriction of fuel since the war has brought out many valuable facts with regard to fuel consumption, one of the most important being that the London motor omnibus represents the highest degree of perfection in motor operation. The buses are running regularly with an average of over 10 miles to the gallon, that is the Imperial gallon, which is approximately a sixth larger than the American gallon.

Further efficiency of these buses is brought out in the fact that their lost mileage is less than 1 in 1000, this being the 1915 official figure for 3000 buses. In the two years before the war the London buses did over 100,000,000 miles per year. On much of this the average was over 10 miles to the gallon. On official tests with a fully laden bus driven by experts over 70 ton-miles per gallon is the figure given. The average daily mileage per bus is 115.

Further examples of war thrift throughout England comes from the London police, who have notified the leading manufacturers of buses that in the future licenses will not be issued unless the buses are considerably lighter in weight and quieter in operation than the existing types. No definite specifications as to how such changes can be made have been given out, the information being in the form of a preliminary warning.

The moment peace is in sight it is expected that many other changes spelling thrift and greater efficiency will take place throughout England. One of these is the nationalization of all roads in the country. Heretofore every small council has taken care of the roads in its district, this applying to main roads as well as obscure ones. The Road Board formed some time ago to take over this great problem has accumulated large funds from taxes on gasoline, and it is expected that important improvements in the English road system will come about by action of this board.

The Georgian Circuit



Map showing route of the Georgian circuit in Pacific Northwest

EACH year Victoria, B. C., is the scene of the annual celebration of the opening of the Georgian Circuit, planned and carried out very successfully by the Victoria and Island Development Association, when visitors from Vancouver, Seattle, Tacoma, Port Angeles and other cities are entertained by sightseeing tours, etc.

Alderman Todd, of the city of Victoria, president of the Automobile Association, vice-president of the Pacific highway, and an international figure in the promotion of the good roads movement, conceived the idea of the creation of a Georgian Circuit two years ago last January. The scheme was fully realized when the Olympian highway was opened in 1915, which opened new delights and highways for the tourists. The formal opening was held on the outskirts of the city of Port Angeles on Aug. 14, 1915, although for several weeks previous to this time cars had been making the tour of the circuit.

The name Georgian Circuit was given to this route for various reasons, but the chief reason is historical and the name Georgian Circuit and the Gulf of Georgia will always be closely related. In 1739 Captain Vancouver named all the territory through which this tour passes, the Gulf of Georgia in honor of King George of England. In February, 1915, it was almost 100 years of peace between the United States and Canada and Mr. Todd conceived the idea that a circuit for touring cars would be a lasting memorial of the friendship between the two countries and a perpetual pleasure for the tourist. Thus the name Georgian Circuit was given to this wonderful road leading around the shores of the Gulf of Georgia which is thus the principal international geographical feature embraced in this marvelous highway.

Among the motor routes of the Pacific Northwest this tour stands out most preeminent and conspicuous as the one which will give the most scenic beauty and at the same time the many comforts and conveniences of travel. The Georgian Circuit is a successful route which takes in at one grand sweep all the scenic charm and varied delights of the many roads connecting the following cities: Seattle, Vancouver, Duncans, Nanaimo, Bellingham, Port Angeles, Port Townsend, Olympia, Tacoma and Everett and numerous smaller cities and towns.

A glance at the map will soon acquaint you with the fact that the distance around this circuit is, roughly speaking, about 500 miles, but there are so many side roads that the distance can easily be doubled and even tripled. There is no starting point on this tour, one can start anywhere and go either way and make a tour of 500 miles without going over any part twice.

Commissioner Cuthbert, of the Victoria and Island Development Association, says:

"There is no tour on the Northern American continent with more attractions or more varied scenery, or more delightful and cool retreats."

There is always the garage for the machine and hotels for the traveler and one need never fear the lack of modern comfort, for everywhere along the magnificent highway the most modern convenience will be found.

The most favorite time for travel is from the beginning of May to the end of October and during that time thousands upon thousands of machines pass over this scenic miracle. The weather may be hot as the desert elsewhere, but here the air is always cool as the roads are forest-bordered and the sea breezes and the cool winds from the snow-capped Olympics and Cascades are always blowing. One may travel from Victoria around the circuit and back to Victoria and never see a bug or a reptile of any kind for these creatures are not found in this district.

This wonderful trip will include two trips over the water on ferries. From Vancouver to Nanaimo is 40 miles and the trip is beyond description; the steamers are fast and most commodious. The distance from Port Angeles to Victoria is 20 miles which the steamer makes in short time amid the most varied scenery.

When the Georgian Circuit becomes known to the motorist of the east, thousands will find their way to this wonderful Pacific Northwest.

Routes and Touring Information

Hitchcock, S. D.—Mason City, Iowa

HITCHCOCK, S. D.—Editor MOTOR AGE—Give route from here to Mason City, Iowa.—E. L. Kruse.

From Hitchcock, drive to Huron, Iroquois, Manchester, Desmet, Lake Preston, Arlington, Volga, Brookings, Lake Benton, Tyler, Balaton, Tracy, Walnut Grove, Revere, Lamberton, Springfield, Sleepy Eye, New Ulm, Courtland, Kerns, Mankato, Janesville, Waseca, Owatonna, Geneva, Glenville, Albert Lea, Northwood, Kensett, to Mason City.

Chicago-Denver, Col.-Los Angeles, Cal.

Chicago—Editor MOTOR AGE—Outline route from here to California, passing through Denver—Lew M. Goldberg.

From Chicago go to Lombard, West Chicago, Geneva, De Kalb, Creston, Rochelle, Ashton, Dixon, Sterling, Morrison, Unionville, Fulton, Lyons, Ia., Clinton, Dewitt, Grandmound, Wheatland, Lowden, Mechanicsville, Mt. Vernon, Cedar Rapids, Belle Plaine, Chelsea, Tama, Montour, Legrand, Marshalltown, Lamoille, Nevada, Ames, Boone, Ogden, Grand Junction, Jefferson, Glidden, Westside, Vail, Denison, Marion, Dunlap, Woodbine, Logan, Missouri Valley, Council Bluffs, Omaha, Neb., Waterloo, Fremont, Ames, North Bend, Schuyler, Richland, Columbus, Clarks, Central City, Chapman, Grand Island, Alda, Wood River, Shelton, Gibbon, Kearney, Overton, Lexington, Cozad, Willow Island, Gothenberg, North Platte, Sutherland, Paxton, Ogallala, Brule, Bigspring, Chappell, Lodgepole, Kimball, Bushnell, Pine Bluff, Wyo., Egbert, Cheyenne, Dover, Nunn, Pierce, Ault, Lucerne, Greeley, Evans, Brighton, Denver, Colo.

From Denver continue to Littleton, Sedalia, Castle Rock, Colorado Springs, Fountain, Pueblo, Crow, Greenhorn, Walsenburg, Aguilar, Trinidad, Raton, N. M., Maxwell, French, Springer, Colomor Nolan, Watrous, Las Vegas Tecolote, Pajarito, Pecos, Canoncito, Santa Fe, Domingo, Alameda, Albuquerque, Kirkpatrick Spring, Becker, Socorro, Magdalena, Datil, Quemado, Springerville, Cooley's Ranch, Rice, Globe, Fish Creek, Mesa, Tempe, Phoenix, Liberty, Buckeye, Arlington, Agua Caliente, Palomas, Dome, Blaisdell Sta., Yuma, Holtville, El Centro, Dixieland, Campo, Jamul, Lemongrove, San Diego, La Jolla, Torres Pines, Cardiff, Oceanside, Irvine, Tustin, Santa Ana, Anaheim, Fullerton, Montebelo, Los Angeles.

Vols. 5, 7 and 8 of the Automobile Blue Book, published by the Automobile Blue Book Publishing Co., 910 South Michigan avenue, Chicago, contain complete running directions for this trip.

Denver, Col.—White Mountains, N. H.

Denver, Col.—Editor MOTOR AGE — Outline route from here to the White Mountain district of New Hampshire via Kansas City, St. Louis, Nashville and Washington, returning via Chicago.—H. A. Lindsley.

From Denver go to Bennett, Limon, Bovine, Flagler, Seibert, Stratton, Burlington, Kanorado, Kan,, Ruleton, Goodland, Brewster, Colby, Oakley, Grainfield, Quinter, Wakeeney, Ellis, Yocemento, Hays, Victoria, Walker, Russell, Bunker Hill, Wilson, Ellsworth, Salina, Abilene, Detroit, Junction City, Fort Riley, Ogden, Manhattan, Wamego, St. Mary's, Rossville, Silver Lake, Topeka, Lawrence, Eudora, DeSoto, Bonner Springs, Kansas City, Independence, Levasy, Wellington, Lexington, Waverly, Grand Pass, Marshall, Arrow Rock, Booneville, ferry across Missouri river, New Franklin, Rocheport, Columbia, Fulton, Warrenton, Wright City, Wentzville, Dardenne, St. Charles, Junction, St. Louis, East St. Louis, Ill., Edgemont, Belleville, Freeburg, New Athens, Lenzburg, Old Town, Marissa, Tilden, Coulterville, Pinckneyville, Vergennes, Murphysboro, Carbondale, Makanda, Cobden, Anna, Mill Creek, Tamms, Sandusky, Unity, Cairo, Ohio River ferry, Sickliffe, Ky., Barlow, La Center, Heath, Maxon, Paducah, Briensburg, Eggner's ferry, Golden Pond, ferry, Cadiz, Hopkinsville, Clarksville, Adams, Springfield, Nashville, LaVergne, Murfreesboro, Beechgrove, Noah, Manchester, Hillsboro, Pelham, Wonder Cave, Monteagle, Tracy City, Sequatchie, Jasper, Rankins ferry, Wauhatchie, Chattanooga, Red Bank, Daisy, Sale Creek, Coulterville, Graysville, Dayton, Sheffield, Spring City, Lorraine, Roddy, Glenalice, Rockwood, Kingston, Lenoir City, Concord, Knoxville, Straw Plain, New Market, Jefferson City, Morristown, Warrensburg, Greeneville, Tusculum, Limestone, Telford, Jonesboro, Johnson City, Milligan, Elizabethton, Childras, Bluff City, Bristol, Abingdon, Chilhowie, Marion, Atkins, Wytheville, Newbern, Ingalls ferry, Radford, Christiansburg, Shawsville, Elliston, Salem, Roanoke, Blue Ridge, Thaxton, Bedford City, Lynchburg, Concord, Spout Spring, Appomattox, Evergreen, Pamplin, Prospect, Farmville, Burkeville, Nottoway, Blackstone, Wellville, Hebron, Sutherland, Petersburg, Richmond, Ashland, Coatesville, Mantico, Chilesburg, Partlow, Snell, Spotsylvania, Fredericksburg, Falmouth, Mountain View, Garrisonville, Dumfries, Occoquan, Lorton, Accotink, Alexandria, Washington, D. C., Beltsville, Laurel, Baltimore, Kingsville, Belair, Churchville, Aberdeen, Havre de Grace, Principio Furnace, Charlestown, Elkton, Md., Newark, Del., Wilmington, Marcus Hook, Pa., Chester, Norwood, Darby, Philadelphia, Bustleton, La Trappe, Langhorne, Trenton, N. J., Lawrenceville, Princeton, Franklin Park, New Brunswick, Metuchen, Rahway, Elizabeth, Newark, Jersey City, Weehawken to New York.

From New York continue to Scarsdale, White Plains, Bedford, Cross River, South Salem, Ridgefield, Conn., Danbury, Newtown, Sandy Hook, Southbury, Woodbury, Middlebury, Waterbury, Marion, Plantsville, Southington, Plainville, Farmington, W. Hartford, Hartford, East Hartford, South Windsor, Warehouse Point, Enfield, Thomsonville, Longmeadow, Mass., Springfield, Holyoke, Northampton, S. Deerfield, Greenfield, Bernardston, Guilford, Vt., Brattleboro, Putney, Westminster, Bellows Falls, South Charlestown, N. H., Charlestown, Claremont, Ascutneyville, Windsor, Hartland, White River Junction, Hartford, W. Lebanon, N. H., Hanover, Lyme, Orford, Piermont, Haverhill, Woodsville, Bath, Lisbon, Littleton, Bethlehem, Maplewood, Twin Mountain House, Bretton Woods.

Vols. 7, 6 and 2 of the Automobile Blue Book contain complete running directions for the above trip.

Champaign, Ill.-Alma, Mich.

Champaign, Ill.—Outline route from here to Alma, Mich., via Huntington, Ind.—G. W. Robinett.

From Champaign, travel through Homer, Danville, Covington, Stonebluff, Rob Roy, Lafayette, Brookston, Monticello, Idaville, Logansport, New Waverly, Peru, Wabash, Fort Wayne, Maysville, Hicksville, O., Farmer, Bryan, Pulaski, Alvordton, Waldron, Mich., Hudson, Somerset, Jackson, Mason, Holt, Lansing, DeWitt, St. Johns, Ithaca, to Alma.

Vol. 4 of the Automobile Blue Book published by the Automobile Blue Book Pub. Co., 910 South Michigan avenue, Chicago, contains complete running directions for this trip.

Mitchell, S. D.-Trenton, Mo.

Mitchell, S. D.—Editor MOTOR AGE—Give a route from here to Trenton, Mo., preferably by way of Omaha, Neb.—W. Bauer.

From Mitchell, go to Alexandria, Emery, Canastota, Sioux Falls, Worthing, Beresford, Elk Point, North Riverside, Ia., Sioux City, Salix, Sloan, Whiting, Onawa, River Sioux, Missouri Valley, Omaha, Neb., Council Bluffs, Ia., Glenwood, Randolph, Shanandoah, Tarkio, Mo., Wilcox, Maryville, Savannah, St. Joseph, Osborn, Cameron, Hamilton, Nettleton, Chillicothe, north to Trenton.

Vincennes, Ind.—Coffeyville, Kan.

Wann, Okla.—Editor MOTOR AGE—State a good route from Vincennes, Ind., to Coffeyville, Kan.—H. A. Sheldon.

From Vincennes, proceed to Lawrenceville, Ill., Olney, Noble, Clay City, Flora, Salem, Odin, Sandoval, Beckemeyer, Ariston, Lebanon, O'Fallon, Edgemont, East St. Louis, St. Louis, Mo., Dwyer, Loehr, Grover, Hollow, Washington, Berger, Hermann, Morrison, Ghamois, Osage City, Jefferson City, Centertown, California, Clarksburg, Tipton, Otterville, Sedalia, Montserrat, Warrensburg, Centerview, Holden, Strassburg, Pleasant Hill, Kansas City, Harrisonville, Archie, Adrian, Butler, Rich Hill, Arthur, Horton, Nevada, Moundville, Liberal, Nashville, Joplin, Crestline, Kan., Columbus, Oswego, Altamont, Independence, Wayside, Havana, Caney, Tyro, Dearing, to Coffeyville.

Vols. 5 and 7 of the Automobile Blue Book, published by the Automobile Blue Book Pub. Co., 910 South Michigan avenue, Chicago, contains running directions on this trip.

Maryville, Mo.-Los. Angeles, Cal.

Maryville, Mo.—Editor MOTOR AGE—Which is the best route from here to Los Angeles?—Phil Smiley.

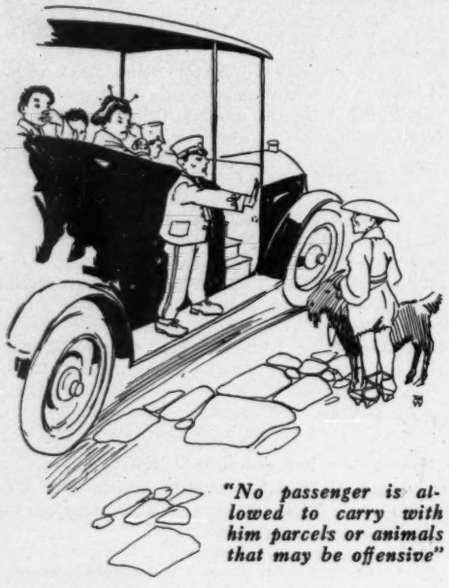
From Maryville go to Savannah, St. Joseph, De Kalb, Weston, Platte City, Parkville, North Kansas City, Kansas City, Harrisonville, Archie, Adrian, Butler, Rich Hill, Arthur, Horton, Nevada, Moundville, Bronaugh, Liberal, Nashville, Galesburg, Joplin, Crestline, Kan., Columbus, Oswego, Altamont, Independence, Sedan, Wauneta, Cedarvale, Winfield, Wichita, Cheney, Kingman, Cunningham, Pratt, Cullison, Mullinville, Dodge City, Cimmaron, Garden City, Deerfield, Lakin, Kendall, Syracuse, Holly, Colo., Granada, Lamar, Hasty, Las Animas, La Junta, Timpas, Thatcher, Tyrone, Hoehne, Trinidad, Raton, N. M., Maxwell, French, Springer, Colomor, Nolan, Wagon Mound, Watrous, Las Vegas, Tecolote, Pajarito, Pecos, Canoncito, Santa Fe, Domingo, Alameda, Albuquerque, Kirkpatrick Spring, Becker, Socorro, Magdalena, Datil, Quemado, Springerville, Cooley's Ranch, Rice, Globe, Fish Creek, Mesa, Tempe, Phoenix, Liberty, Buckeye, Arlington, Agua Caliente, Palomas, Dome, Blaisdell Sta., Yuma, Holtville, El Centro, Dixieland, Camp, Jamul, Lemongrove, San Diego, La Jolla, Torres Pines, Cardiff, Oceanside, Irvine, Tustin, Santa Ana, Anaheim, Fullerton, Montebello to Los Angeles.

Vols. 7 and 8 of the Automobile Blue Book, published by the Automobile Blue Book Publishing Co., 910 South Michigan avenue, Chicago, contain complete running directions for this trip.

Motor Car Traffic *Jinrikisha-ized*

Nippon Car Operators Drive Under Rules That Bring a Smile

By William K. Gibbs



"No passenger is allowed to carry with him parcels or animals that may be offensive"

TRAFFIC regulation is a serious problem and deserves serious consideration, but the rules in force in one city of the world are so different, so primitive, when compared with what we are obliged to accustom ourselves to every day, that the serious side may be tabled for the moment and if, perchance, you should find a smile generated by the excerpts that follow, the purpose of giving them currency will have been fulfilled.

The Motor Club Speaks

Before giving the excerpts from this newly-discovered traffic regulation let us see what the motor club of the city where they are in force has to say of motor traffic. "The automobile is looked upon by many as a dangerous machine, but for what reason? If it is a good machine and is driven by a competent chauffeur, what is there dangerous about it? On the other hand, in defense of the automobile, you will find pedestrians everywhere except on the pavement. They do not heed the horn and you may even find them *reading books in the street.* . . . The people are not accustomed to the automobile and unless the driver is especially careful in handling the car and not to direct bad language on them as they pass on, the feeling toward the motor car and its occupants will remain unfavorable. . . . . Some people dislike the haughty motorist, who comes along thoughtlessly and chases them to and fro with the terrible noises and his disagreeable exhaust."

"We have already warned them," says a police bulletin, with reference to careless drivers of cars, "to drive slowly in crowded streets, not to splash mud on the people who are walking along and to be polite and attentive to anyone."

Now for some verbatim clauses in the traffic ordinance itself:

"The speed of a motor vehicle shall in no case exceed 10 m.p.h. in the urban district and 12 m.p.h. in the suburban districts and *that of pedestrians in cases where the road is crowded.*

"Every automobile shall be equipped with two brakes, one working on a drum fixed on the wheel or axle, the other working on the other parts of the machinery.

"Each vehicle shall be equipped with a maximum speedometer and if it is run by steam pressuremeter and water gage shall be fixed in an easily visible place.

"The machine shall be one that produces no great noise or vibration.

"No motor vehicle shall produce a large volume of odor, poisonous gas, steam or smoke."

With the reference to public cars the ordinance says:

"Passengers and the public shall be treated with courtesy and politeness and *no insulting or overbearing words shall be spoken.*

"Special protection and care shall be extended to the *young and old and weaker sex* when they go in or out of the car.

"Care shall be taken to make sure if there is nothing left by the leaving passenger.

"No stuff that is likely to smear or give out bad smell shall be taken in the passenger car.

"The maximum speed shall in no case be *overdeveloped.*

"When two or more motor cars run one after another the car behind the other shall be a distance of at least 60 yds.

"When passing by the military, the car shall be steered to the right whilst at all other times to the left."

The following persons are not permitted to take a ride:

"One who is drunk.

"One who is suffering from one of the eight contagious diseases or from a detestable disease.

"One whose dress is so dirty that it may give an unpleasant feeling to fellow passengers.

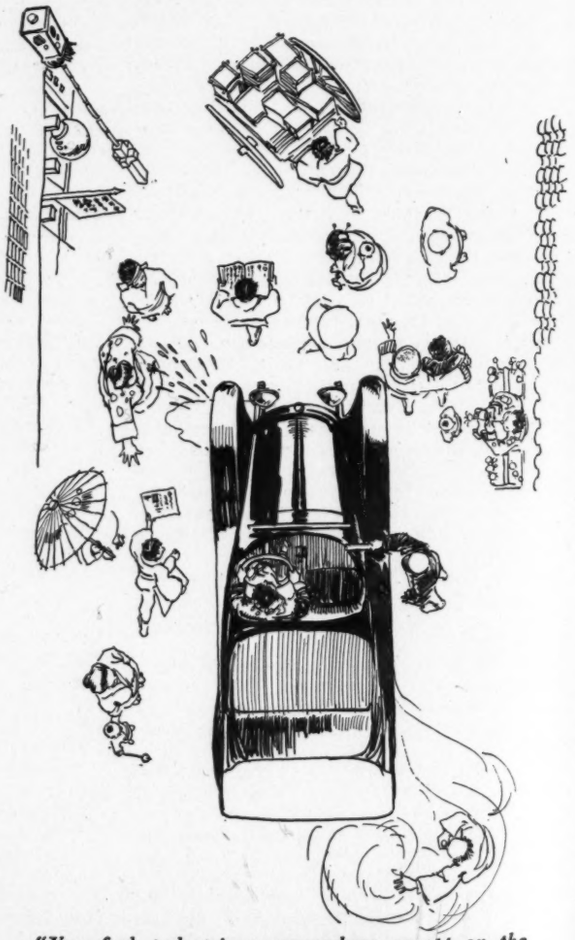
"No passenger is allowed to carry with him parcels or animals that may be offensive on account of odor or otherwise to passengers.

"No passenger is allowed to sing aloud, make a noise or act in such a way as to disturb other passengers.

"In order to enable the course of the vehicle to be dextrously changed *differential* steering gear shall be provided.

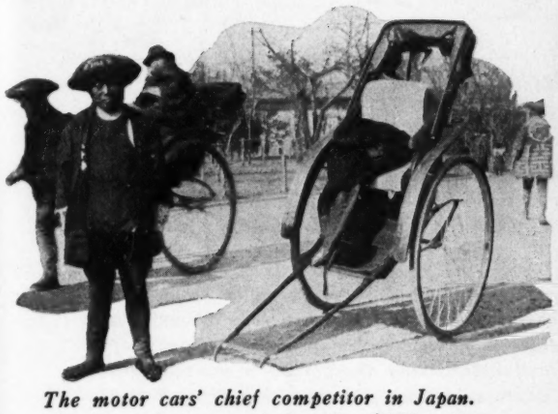
"Drivers are not allowed to smoke while driving a car."

You wonder where such regulations are in force? Hist! Tokyo, Japan. Of course, Japan finds the motor car a newer product than we do in America. Besides her streets were not laid out to accommodate such vehicles. A jinrikisha path is not a motor road and besides, the millions who are subjects of Nippon are naturally cramped for room so that the roads are very likely to be over-run by pedestrians.

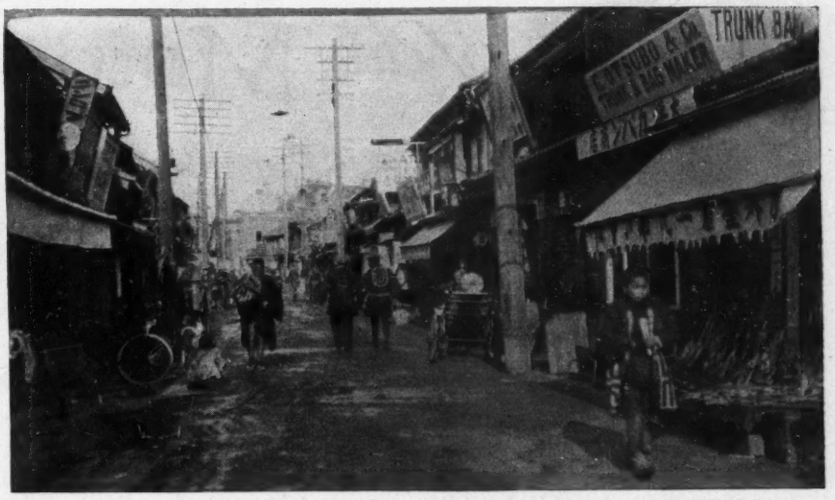


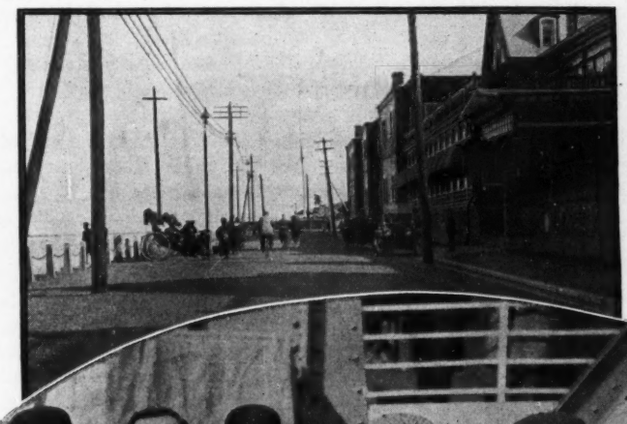
"You find pedestrians everywhere except on the pavement . . . You may even find them reading books in the streets"

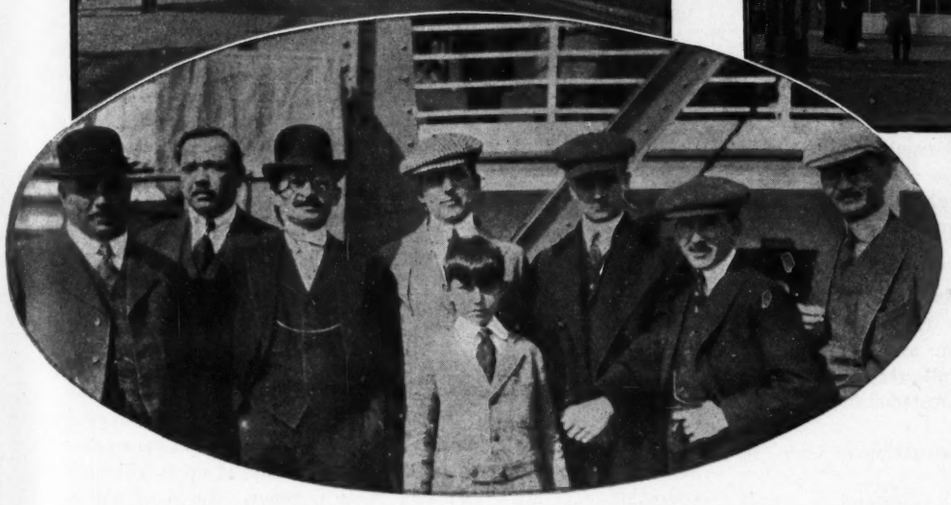
In the Land of Jinrikishas



The motor cars' chief competitor in Japan. You can ride in one of these for $1.50 a day







Top—Average street in Yokohama, narrow and filled with pedestrians. Middle, left—The Bund, Yokohama's principal motor thoroughfare, skirting the bay. Middle, right—The average Yokohama garage, of which one concern may have several scattered about the city for ready furnishing of cars. In oval—Groups of motor car dealers returning to the Orient on the Empress of Asia, after placing orders with American manufacturers.

THE Nipponese Empire is one country that far exceeds the most fanciful expectations of the tourist, according to the first word received from Hi Sibley, MOTOR AGE's special representative, who is now in Japan studying motor conditions and who will write a series of articles to appear from time to time during the coming summer.

Mr. Sibley's writing is known to MOTOR AGE readers, since he has for the last two years had many articles on military affairs in Europe, where he was a member of the American Ambulance Corps, and later, on the border, where he was with the expeditionary force sent out to capture Villa.

The illustrations on this page are some which Sibley took on his arrival in Yokohama after a trip over on the Empress of Asia in company with a number of dealers who were returning to the Orient after having visited American motor car and accessory manufacturers and placed their orders.

Impressions of Japan

Quoting from Mr. Sibley's first letter: "The motor car is just beginning to get a toe-hold in Japan; competition of the jinrikisha, the popular means of transportation, is pretty stiff, for the latter is built for and adapted to the narrow and winding streets. A motor car going at a moderate Michigan avenue or Sheridan road pace would leave a wake of squashed babies, kayoodling purps and crippled old ladies, to say nothing of a few wrecked houses at sharp corners of the cramped and pedestrian-congested streets. Every inch of town and country is picturesque and everything is planned on the scale and daintiness of a toy community."

The Nipponese Empire is rapidly becoming motorized. Introducing motor cars into Japan has necessitated some revolutionary changes in roads and traffic regulations which Mr. Sibley will explain in detail in later issues. He now is on his way back to America.

Electrical Equipment of the Motor Car

By David Penn Moreton & Darwin S. Hatch.

Editor's Note—Herewith is presented the forty-eighth installment of a weekly series of articles begun in MOTOR AGE *issue of June 29 designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the Class Journal Co., Chicago, in a size to fit the pocket conveniently.*

The fundamentals of electrical circuits of the motor car were explained through their analogy to water systems, and the relations of current pressure and resistance were brought out. This was followed by an explanation of series and multiple circuits, how electricity is made to do work in lighting, starting, signalling, etc. Calculating the capacity of a battery for starting and lighting and the cost of charging storage batteries and determining the torque a starting motor must develop were explained. Action of primary batteries and dry cells was considered. A section was devoted to the makeup and action of lead and Edison storage batteries, and another to the care of lead batteries in service and the best methods of charging them. Magnets and electromagnetism then were considered, and the principles of generators and motors explained.

XLVIII—Electrical Lamps and Instruments

THE high candlepower electric lamps are the cause of a great deal of trouble due to the blinding glare they produce, and as a result the driver of a car is greatly annoyed when he is compelled to drive toward high-powered headlights. A great deal has been done by various motor organizations and there has been some legislation to bring about a more reasonable use of high candlepower lamps.

Two bulbs quite often are used in each headlight, as shown in Fig. 275. The second bulb is of low candlepower, and in addition it is out of focus. As it is inserted in the upper side of the reflector, most of the light is directed downward, all of which results in practically no glare. A very similar result is obtained by the use of two filaments in a single bulb as shown in Fig. 276. The back filament is employed for the high candlepower light and is in focus while the outer filament is for the low candlepower light and is out of focus.

Electrical Instruments

The following electrical instruments are the ones that commonly are encountered in motor car work, and their purpose and operation will be described in the following paragraphs: Ammeters, voltmeters, ampere-hour meters, wattmeters, watthour meters.

The ammeter is an instrument whose construction is such that when properly calibrated it will give an indication at the end of a pointer which moves over a scale of the value of the current of electricity in the circuit of which the ammeter itself is a part.

The voltmeter is an instrument whose construction is such that it will give an indication of the value of the difference in electrical pressure between two points in an electrical circuit to which the terminals of the instrument are connected.

An ampere-hour meter is an instrument for measuring the quantity of electricity passing through an electrical circuit in a given time, and its construction is such that it sums up the successive products of current and time and thus total quantity is registered on a dial by means of a pointer which moves over a graduated scale.

The wattmeter is an instrument for measuring power, that is, current in amperes times electrical pressure in volts. Its construction is a combination of an ammeter and a voltmeter, the product being indicated by a pointer which moves over a graduated scale.

The watthour meter is an energy meter, and it sums up the products of the power and time and registers this product on a dial or dials located on the front of the instrument.

The operation of all ammeters depends upon some effect produced by the electric current. They may be classified conveniently according to the particular effect of the current upon which their operation depends. The two most common effects of an electric current are its magnetic effect and its heating effect, and the majority of the ammeters on the market at the present time depend upon one or the other of these two effects for their operation, especially the magnetic effect. The chemical effect of a current may be used in measuring the value of the current, but this method is so little used in comparison to the magnetic and heating effects that we will confine our description to the two most commonly used effects.

There is a magnetic field surrounding an electrical conductor in which there is a current of electricity, as explained in detail in one of the previous chapters, and the strength of the magnetic field varies with the value of the current in the conductor, increasing with an increase of current and decreasing with a decrease of current. The majority of the ammeters in use at the present time depend for their operation upon this magnetic effect of the current, and their chief difference lies in the method of applying the effect to the operation of the different makes and models.

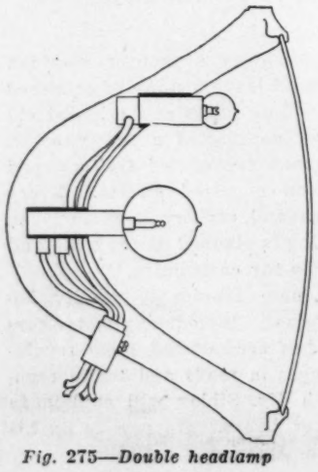


Fig. 275—Double headlamp

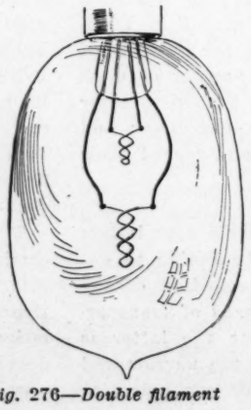


Fig. 276—Double filament

The Motor Car Repair Shop

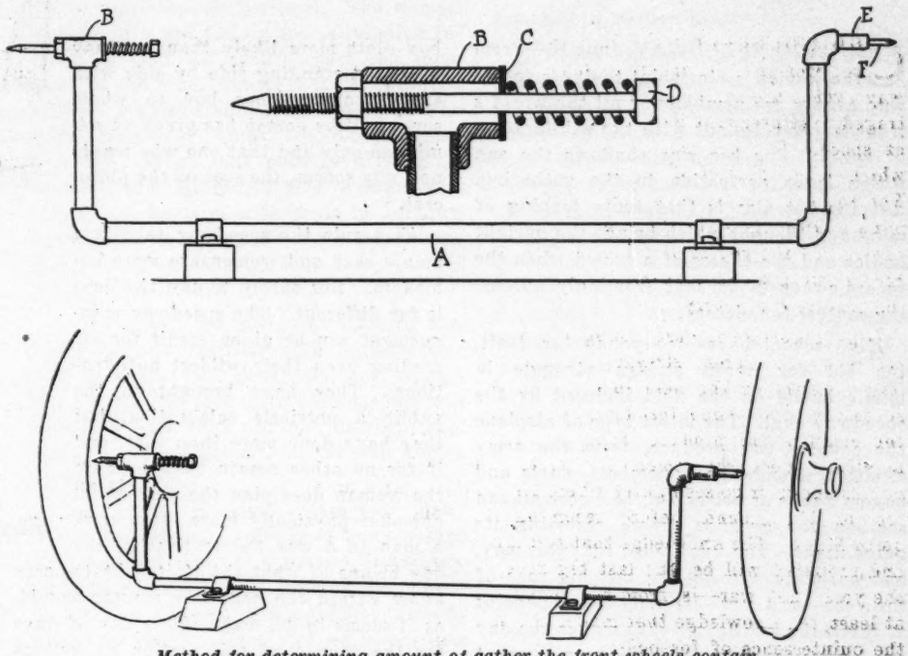
Testing the Wheels of a Car

IN order that the front wheels of a motor car will steer properly they must have a certain amount of what is commonly called gather. The proper amount of gather is obtained by adjusting the cross link that connects the steering arms of the front spindles. Ordinarily the amount of gather is from ¼ to ⅜ in. This means that the extreme forward points of the wheel felloes should be from ¼ to ⅜ in. closer together than the hindmost points of the felloes.

To Test Amount of Gather

A handy device for determining the amount of gather can be made out of a few lengths of gas pipe, together with a few elbows and tees, as shown in the illustration. The pipe A can be cut to the proper length when all the rest of the parts have been made, as this will assure of the apparatus having the right width to fit between the wheels. On one of the upright pieces of pipe an adjusting device is made consisting of a pipe tee B into which is fitted a bushing C. The latter is fitted with a bolt D, held in place at one end by a coil spring and a nut at the other. By turning the nut in or out the distance between the measuring points of the apparatus can be varied. Only one end is made adjustable, the other being simply provided with a short length of pipe E into which has been fitted a small piece of rod F. The pipe A is mounted upon two wood blocks and held to them by pieces of strap iron. Pipe A should not be held absolutely rigid to the blocks, to enable wheels of different diameters being accommodated.

In use the apparatus is placed in front of the axle, the wheels having been set in a straight forward direction. The nut on the adjustable head is now regulated so that the measuring points just touch the felloes at the extreme forward points. Care must be taken to see that the apparatus is parallel with the front axle. This can be done by means of a yard stick or rule. Now with the adjustments secured in this position, the measuring device is moved to the rear of the car and placed between the rear wheels so that the measuring points come on the felloes as before. If the wheels are properly lined up, with one of the points touching the felloe on one wheel, the other end will lack from ¼ to ⅜ in. of touching the other felloe.

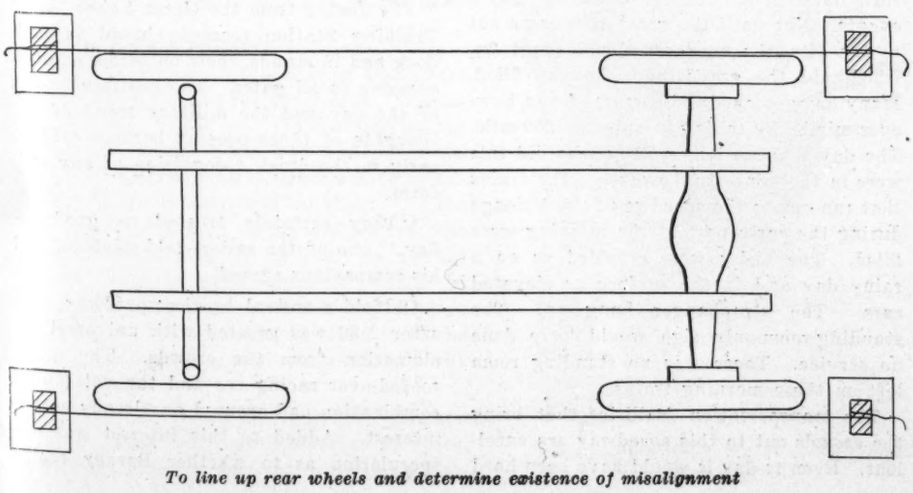


Method for determining amount of gather the front wheels contain

To test the trueness of a wheel, jack up the axle so that the wheel clears the floor, spin it, and while it is revolving hold a pencil point or something similar close to the felloe of the wheel, resting the hand on the knee or a block of wood to hold it steady. Then regularity or irregularity of the distance between the felloe and the pencil point as the wheel revolves then will show whether or not the wheel is true.

To True Rear Wheels

To line up the rear wheels to see whether or not they are parallel, two strings are stretched across four chairs or the like in the manner shown. The string is stretched so that it almost touches the tires, say about ⅛ in. from them and it should be on a level with the floor at the height of the axles or immediately above or below them. The two strings should be parallel and also parallel with the side members of the frame of the car. When the strings have been stretched, take a ruler and measure the distance between the felloes of the wheels on both sides of the hubs. Rear wheel misalignment may be due to a bent axle shaft or the axle not being at perfect right angles with the frame of the car. A sagging spring or worn spring links will also throw the rear wheels out of line. If misalignment is found in the front wheels, the springs may have shifted, the steering arms may be bent, the transverse steering rod may be out of adjustment or the wheels themselves may be out of true.



To line up rear wheels and determine existence of misalignment

Looking at the Race

From the Woman's Viewpoint

Parked cars served as siesta means between events

CHICAGO, SPEEDWAY, June 16—From the woman's viewpoint to-day's speedway events are symbolic of all the world's tragedy yet pregnant with the exhilaration of speed. For her war shadows the sun which lends perfection to the gathering. Yet for her also is that tense leaping of mind and thought which brings the upright bodies and the cheers of a crowd when the racers sweep by in that seemingly unceasing contest for victory.

High school boys—too young for draft, too old for apron strings—struggle in mimic battle on the field inclosed by the speedway oval. The latest type of airplane the country can produce, from the army aviation school, she remembers, darts and hovers above or poises lightly where all can see, on the ground, before resuming its quick flight. The knowledge that this may, and probably will be, the last big race of the year—and war—is, from her viewpoint at least, the knowledge that makes the day the quintessence of foreboding as to what these same high school boys may be doing before the cycle of time has turned further than to make them eligible for real warfare.

More Than 40,000

The crowd to-day is estimated all the way from 40,000 to 60,000. Nobody probably can compute it exactly; certainly not now, for the attendance is a shifting one. Look over the paddock and the rows of high school boys, some 3,500 strong, extend from one end of the 2-mile inclosure to the other. Other thousands throng the aviation section of the field, the parking spaces, the judges and press stands, the free-for-all standing room to which admission-only tickets admit.

Women are here in great numbers. They mingle with the line of spectators who stand by the side of the attacked trenches of the mimic warfare as no spectators ever stand by the side of the atteked trenches of real warfare. They, the chosen few who are granted that privilege, look with awe and interest and perhaps a little more of that foreboding on the wide-winged creatures of man that the steady-nerved, strong-hearted aviators guide up and away from time to time.

The grandstands are mere resting places. The crowd shifts restlessly to-day. This is more than a patriotic celebration which is to add to the interest, and sustain the former interest, attendant on a 250-mile grind. The men and women wearing the tags which entitle them to grandstand and box seats more likely than not may be found standing side by side with the fortunate office boy to whom some godlike person has given an admission-only and that one who wants not, nay scorns, the seat of the plutocrat.

As a rule the speedway race is a man's race and women are mere onlookers. But surely to-day the case is far different. The speedway management can be given credit for exceeding even their wildest anticipations. They have brought to the public a patriotic celebration, but they have done more than that, and if for no other reason than because the woman does play the part of an onlooker physically more often than a man in a war the realization the day brings of what the United States may know within the next few months should, as it seems to do, make this a day of days for the women of this section as well as the men.

In the play creeping of the high school soldiers as they move from point to point in the rather long approach to the trenches, play trenches, there is a realism that is kin to tragedy. The woman-instinct, if you would call it that, sees ahead and sees all the bad, if not the good, of war and what must be sacrificed for it.

The airplanes are real. The bombs are real. The smoke curtain is horrible. A nightmare. In short, if it were not for the races to-day and the general gala appearance of the fellow crowd, this might be a tragedy in truth for many women instead of a day of days of sport.

It is a terrifically interesting race. The race itself is a culmination of the day's events. Not until the great cars came out to the pits, the nonprofessional event finished, did the grandstands become filled. Many have escaped the horrors of war, however mimic, by taking in only the 250-mile. The day was too long. They who did this were in the minority, however. The trains that ran out to the speedway from Chicago during the early part of the morning were filled. The aisles were crowded as on a rainy day and in the surface or elevated cars. The straphanger hung on. The standing-room-only sign would have done no service. There was no standing room left on these morning trains.

The transportation facilities that bring the crowds out to this speedway are excellent. Even to-day it would have been hard to find fault with them. And to-day they were taxed as never before, as this was a record day from the standpoint of local speedway attendance as well as from others.

The red-hot vender had a terrible time keeping up with the voracious clientele. Think what it must have meant to have some 3,500 soldier-boys, even if they were of the high school age, and hence less deadly according to tradition, storm the citadels of your mere kindling-wood stand. But storm they did and when the spectators from the grandstands strolled tentatively out between the 100-mile nonprofessional and the derby to obtain a little surcease of the hunger the occasional grandstand hawker could not satisfy they strolled about a while, willy-nilly, until military wants were supplied.

Jackies Attended

The Jackie from the Great Lakes Naval Training Station roamed abroad in paddock and in stands, their uniforms an open seasame to all gates. The military aspect of the day and the military trend of the thoughts of those present became evident early in the quick recognition of any uniform.

"They certainly treated us good today," one of the sailors told another, and his companions agreed.

Oldfield's arrival on the speedway soon after 2:30 was greeted with universal acclamation from the crowds. The queer roofed-over racing car and the veteran in combination had aroused an already active interest. Added to this interest was the speculation as to whether Barney really

would start in his queer contraption, the taxicab, beetle, eggshell and nobody knows what it wasn't called. Popular belief had Barney out of the race early this morning. A sheared-off ring gear on the differential in the last practice lap of yesterday had made it seem impossible for the car to start. A will made a way. No doubt the dean of racers was determined to start in answer to the speculation. Anyway all-night work put the car in condition, and when the grind started No. 27, Oldfield's number, was in the first four. The taxicab had turned the try-out laps at a speed second only to de Palma's time of 110 m.p.h.

Oldfield and de Palma

Oldfield had the crowd on tiptoe for fear he would beat the favorite, de Palma, when he led the field until tire trouble brought him to the pits. He finally went out at the end of the twenty-fourth lap with a broken valve spring cup, "tire trouble," according to the grandstand announcement. This was the crowd's first big disappointment.

With Oldfield out de Palma held the spectators, but again were they doomed to disappointment as in the last Chicago race, the Grand American of last October, for de Palma's jinx is still on the job and a too-long pit stop lost what may be taken as the race crowd's one best wish, de Palma as a winner.

Never before has the attitude of a race crowd at a speedway been more like that of a Roman amphitheater than this to-day. The reason lies in the entrants and their known ability. That the race was so terrific, both in interest and speed, is due to such names as Oldfield, de Palma, Mulford, Cooper, Chevrolet and others that well might be included, all of which were on the speedway, and in the public's eyes possible winners.

When a leading racer stopped at the pits, the crowd cheered and exhorted the second man. A possible exception to this was de Palma. He had gone down before unexpected bad luck so often and has come up grinning so often that the public feels it a personal affront, judging from the comment in the grandstand, if from nothing else, and keenly resents any halt in the Italian's continued sweep around the oval.

Crowd Very Excitable

The crowd as a whole sprang to its feet more often than at the usual race. Women grew more excited over the standing during the early laps. Girls who had never attended speedway races seemed more insistent to know what it was all about. As the leaders of the field swung around into the home stretch of a lap as likely as not the first voice of encouragement would be feminine. Then men, women and children would rise in one accord to stand until the race had swept around the oval half-way back again.

Cries of "Down in front," so common to the American crowd, whether at opera, baseball game or pageant, were less apparent than ever before in the writer's attendance at public gatherings. Woe to the man or maid who first cried such words. Treason, even. For when speed and skill held sway royalty was present, and this most democratic country must give recognition by standing to the only royalty known here, good sportsmanship.

The names of the racers and the cars they drive have become so familiar to the public that they are personal. The woman who drives a car feels a specially quick interest in that car which bears the same name in the race, even if it is far different in structure and stamina from her own. The more uncommon names, too, have become familiar. Why, that man is driving de Palma's old Mercedes, this woman who drives will exclaim with pride in her own knowledge, and pride fitting a motor fan. That car is the one Oldfield drove at Cincinnati, she is sure.

Cooper's car, the Stutz, the winning car, has long been familiar both to masculine and feminine race observers, and though the car had no elaborate backing but was Cooper's own that did not detract from the interest, as Cooper, too, is well known to the crowd.

The three Hudsons attracted many women's attention, because so many women drive cars of the same name. Other reasons hold the attention, such as the personnel of the drivers, the publicity already given to special cars and such old-time names, from the standpoint of races, as Mercer, Duesenberg and Delage.

That like seeks like is evident at a speedway race as it can be evident no where else. One looks at the cars parked in the paddock, at the cars lining up for the starting flag, the rows and rows back of the grandstands, apparently in an unravelable conglomeration. Yet you know that outside the speedway grounds there is a vastly greater assemblage of cars. Speedway day is a wealthy day for many thrifty folk who have possession of rental of fields into which cars may be crowded.

They were awfully proud of their high school soldiers

Lunches in Parked Cars

Until the big race starts there is a steady passage of men and women from the cars parked back of the grandstands to the paddocks and scene of the athletic events the high schools are holding. Lunches are brought out of tonneaus and runningboard cupboards. Here and there a regular tourist outfit, including a table for the tonneau, gives ease of lunching to those so lucky as to be prepared. The parked cars give that place of retreat and restfulness unknown to other than the car owners in many particulars. In the paddock those so fortunate as to obtain parking spaces where they could remain in their cars and still see all were indeed fortunate.

The trucks which brought the high school cadets out to the speedway were commandeered by chance spectators and made the best of advantage points. Even the tank used in the mimic attack on the trenches did not escape from mere everyday usefulness. At one time during the 250-mile race all the trucks, and there were at least a dozen in easy sight, were serving as observation stands for dozens of persons. The hooded drivers' seats served new purposes. They were higher.

Color Here Too

Color was everywhere on this day of sport days. The stands were decorated with flags, pennants were suspended from cords across the passageway for cars between the clubhouse and garages. Pretty girls and small boy scouts sold the flags of the nations among the spectators. The green and yellow of the women's clothes added to the color of red, white and blue and yellow of flags.

A bright green car was driven by a woman in yellow down the paddock to the parking stands near the pits. Loud? Not at all. Everyone wears a bit of color these days, and at a race of patriotic meaning, it is specially apt. A racer here and there bore the colors on his radiator cap. Most of them no doubt will be serving in the war in some position sooner or later. One of those who might have been here already is serving as aid to an American general. Perhaps the general public does not know but for those who do, and the women are among these, the absence of Rickenbacher, added to the general war tone of this as war cause day, meant much.

A gala day but from the conversation of occasional groups of women a more than that, one that foretells America's part in the great war for humanity.

The Readers' Clearing House

SOME RELEVANT FACTS ABOUT OIL

Tests the Motorist Can Make to Determine the Quality of His Oil

WASHBURN, Tex.—Editor MOTOR AGE—Would like information on the testing of oils, that is, the oiling qualities of oils of parafin and asphalt bases, also the kind and percentages of carbon usually contained in each; lubricating qualities, etc.—T. N. Jameson.

In studying lubricating oils as regards their physical and chemical properties, it must be remembered that all lubricating oils are hydro-carbons, which means that they consist of a physical mixture of different chemical compounds of the elements carbon and hydrogen. Thus the term "non-carbon" oil used sometimes in the trade is obviously a misnomer, inasmuch as it is contrary to chemical laws. The engine oils made in this country are refined from crude oil having either an asphaltic or paraffin base. The crude oil having a paraffin base is considered the best oil from which to refine motor car engine oils, due to the fact that the latter contain no "sulpho" salts, which are entirely foreign to any oil as a lubricant. These "sulpho" salts, or compounds associated with oils refined from an asphaltic base, are caused by the manner in which the oil is prepared. All hydro-carbon oils are prepared for the market by one of two methods. These are called the sulphuric acid method and the filtration process.

Sulphuric Acid Process

In the sulphuric acid process several thousand gallons of oil are placed in a tank and kept constantly in motion by large paddles. The acid is added during the process of agitation and the oil becomes bleached out to a clear color. The whole is then washed with water, neutralized with an alkali salt and the oil bath washed free from the acid and salt. Theoretically the latter is accomplished, but in practice there remains a number of salts or "sulpho" compounds which have a tendency to break down the oil under high degrees of heat in the combustion chambers of the engine. Such acid-treated oils, if their use is long continued, will, in time, attack the metal surfaces of the engine. The effect of hot sulphuric acid gas upon highly-heated exhaust valves and seats is quite noticeable and causes rapid pitting. Oils refined by this process are brilliant to the eye and can be presented to the trade as decarbonized oils without apparent dispute. However, the inner materials referred to as dirt still remain in the oil.

The filtration process consists of letting the oil seep through Fuller's earth, which removes impurities and hydro-carbons of high carbon content. First class oils filtered in this way contain no "sulpho" salts and can be depended upon to stand up under nearly every possible engine condition, so far as the temperature of the interior of the cylinders is concerned.

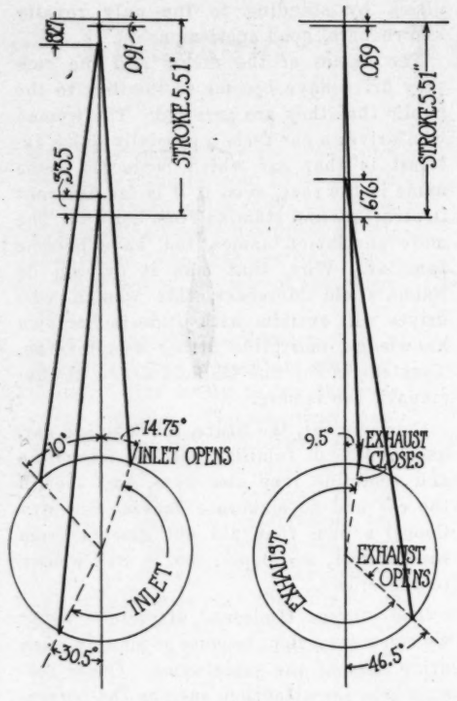


Fig. 1—Valve and ignition timing on 1913 Talbot racer

All engine oils contain a certain amount of carbon called "fixed" carbon, but this should not be confused with the term carbon deposit. Ordinarily in commercial oils the percentage of fixed or carbon residue increases nearly in proportion to the increase in viscosity, being lowest in light oils. The carbon residue that an oil contains does not necessarily indicate the relative amount of carbon deposit which will occur in the combustion chambers of the engine.

Carbon deposit in the cylinders is also caused or influenced by the quality of the oil used, its viscosity, flash and piston-leakage. A choked muffler, incomplete combustion, due to an excess of gasoline mixture or faulty ignition, and dust drawn into the air intake of the carbureter are also more or less responsible for carbon deposits in the cylinders. Also there is a probability that a great deal of this carbon deposit is caused from the gasoline, inasmuch as the latter contains thousands of little particles of sulphur and other substances, which, when burned, will leave a deposit of so-called free carbon. Yet the motorist has been wont to blame his oil for all carbon deposits, and there is about twenty times as much gasoline used as lubricating oil in an engine. The asphaltic base oils are comprised of the series of hydro-carbons containing more carbon to the molecule than those of a paraffin base.

The average motorist is not in a position to make tests of oil which will give to him very definite information about the oil he is using and must take the word of the garage man or dealer who sells him the oil as to the quality of the latter. This, of course, does not apply to dealers who are known to handle oil of repute. But should a motorist suspect that he is getting oil of inferior quality, or suspect sulphonic acid compounds, there are a few simple tests he can make of the oil which will set him right on this point. For instance the heat test will show whether or not sulphonic acid compounds are present in the oil and is carried out as follows:

A small bottle is filled about half full of the oil to be tested and heated slowly over an open flame or electric plate as shown in Fig. 2 until yellow vapors begin to appear above the surface of the oil. The oil is held at this temperature for about 15 min. The heated sample is now compared with an

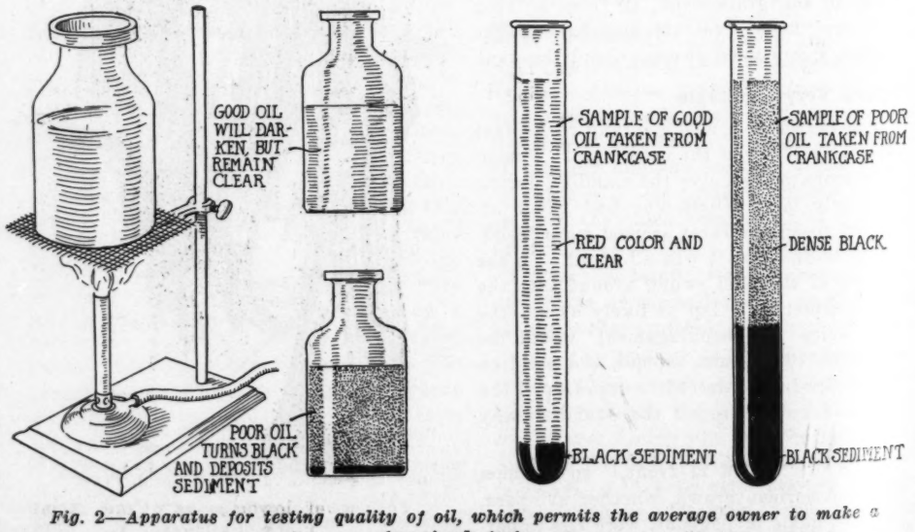

GOOD OIL WILL DARKEN, BUT REMAIN CLEAR
POOR OIL TURNS BLACK AND DEPOSITS SEDIMENT
SAMPLE OF GOOD OIL TAKEN FROM CRANKCASE
RED COLOR AND CLEAR
BLACK SEDIMENT
SAMPLE OF POOR OIL TAKEN FROM CRANKCASE
DENSE BLACK
BLACK SEDIMENT

Fig. 2—Apparatus for testing quality of oil, which permits the average owner to make a few simple tests

unheated sample of the same oil and the quality determined. A good grade of oil will darken in color but remain perfectly clear and with no evidence of sediment, even after it has stood for a day. This will prove the absence of acid compounds. If the oil is impure it will turn jet black when heated and upon standing for any length of time will deposit a black sediment, called "sludge."

Another test for sulpho compounds is known as the emulsion test, and consists of filling a bottle (a 4 oz. will do) about one-third full of the oil to be tested and pouring in an equal amount of water, thus leaving a space of one-third the capacity of the bottle free above the oil and water. The bottle is then corked and shaken very vigorously for half an hour. It is then left to stand for 24 hrs. If the oil is of good quality a fine white line will appear between the oil and clear water below, indicating the absence of acid compounds. On the other hand, impure oil mixes permanently with the water, and appears as a curdled mass, floating upon milky-like water.

Simple Acid Test

A simple way to test oil for acid is to introduce into it a piece of blue litmus paper, which, if there is acid present, will turn to a pink color. Acid can also be detected by saturating a piece of flannel with the oil and placing it upon a bright plate of steel. The whole is then exposed to the sun for 24 hrs., whereupon the plate is wiped dry. If the plate remains as bright as before, indications are that there is no acid in the oil. Should dull spots appear on the plate, however, the opposite is true.

The flash test consists of heating a small quantity of the oil in a porcelain dish over a Bunsen flame, stirring it with a thermometer and applying a lighted match to the surface of the oil occasionally. The flash is the lowest temperature at which the vapors arising from the oil will ignite and go out again without setting fire to the oil itself, when a small flame like that from a match is brought to within ¼ in. of the oil's surface. From about 375 to 415 deg. F. is a proper flash point. Inasmuch as the temperature of the explosion in the cylinder exceeds several times that of the highest obtainable flash, it must be evident that even 100 deg. difference in the flash of two oils is of no avail so far as resisting the destruction which takes place in the combustion chambers of the engine is concerned. Below the piston heads, though the heat conditions are not so severe as above, there is also a chemical reaction within the oil. In fact, no lubricating oil exists that will not undergo chemical and physical changes when exposed to the great heat on both sides of the pistons of motor car engines. This results in all oils depositing a certain amount of sediment in the crankcase. However, there is a marked difference in the rate of sedimentation of oils of good and bad quality used under the same operating conditions and in the same engine. Thus the rate of sedimentation in the crankcase is a measure of the durability and efficiency of the oil. To carry out this test in a practical manner, let us suppose that we have two yellow oils of the same viscosity, one being of poor quality and the other a high grade filtered oil. We will assume that the poor oil has been put in the engine and the latter run for a few hours under average driving conditions. A sample of the oil is taken from the crankcase and placed in a long glass tube for examination. It will be found that after a few minutes the oil will turn to a dense black. The same sample used for several days will, upon standing for a day or so, show a black sediment several times greater than that of good oil.

When an engine is run under the same conditions as that above but with an oil of good quality and a sample taken for examination, a marked difference will be noted in the appearance of the oil. In the first place the oil will have changed from its original yellow color to a grayish-blue by reflected light. If left to stand for 24 hrs. in a glass test tube a black sediment will show at the bottom, and the oil above the sediment will be red in color and equally serviceable as when fresh.

Other tests, principally the viscosity test, cannot be performed by the average motorist because laboratory equipment is necessary as well as experience in handling oils. And too, tests are not aimed always to get at the lubricating efficiency of the oil because that had to be arrived at by long experiment in every day use of the oil. Scientific laboratory tests are made to make sure that the oil is running uniform and up to a certain standard.

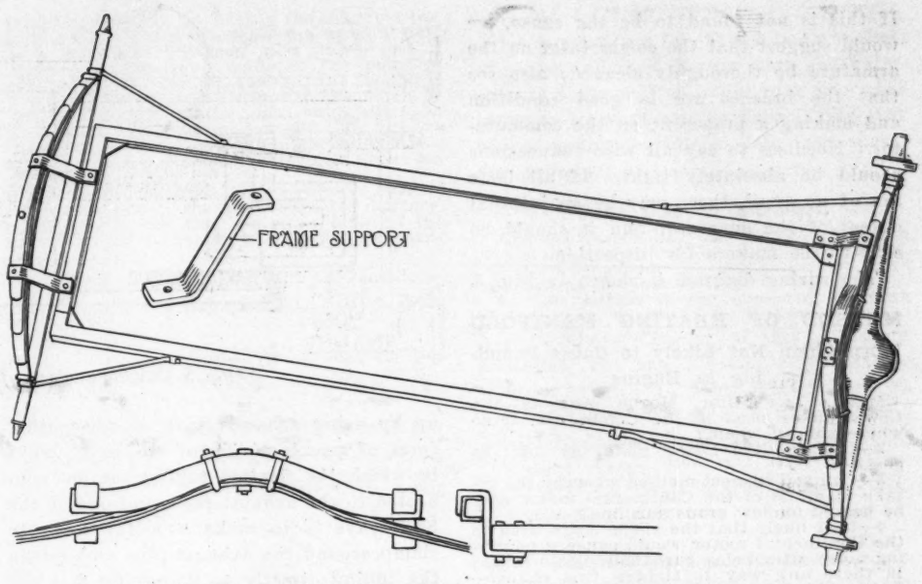


Fig. 3—Diagram illustrating method of lowering the frame of a Ford car

Lowering Frame on Ford

Muskegon, Mich.—Editor MOTOR AGE—Give drawing showing how a Ford frame could be let down so as to let the frame hang between the springs, making the car lower.—E. J. Frans.

A method of lowering the Ford frame is shown in Fig. 3 and shows four suitably bent hooks to fit over the springs. These supports are riveted or bolted to the frame. Another scheme is shown at the bottom of the illustration and in this case curved pieces of metal are fitted over the springs and the frame supported from these by goose necks at each corner.

Details of Hour Record Talbot

Toledo, Ohio—Editor MOTOR AGE—What is the bore and stroke on a 1913 Talbot racing motor? Carbureter size and make? Clear diameter of valves and lift? Timing of valves? Type of cams and tappet? Number of crankshaft bearings and type? Was the crankshaft counterweighted?—Ralph C. Chesnutt.

The bore was 4 in. and the stroke 5½ in. The carbureter was a Stewart-Precision. The valve and ignition timing is shown in Fig. 1. The timing is shown in degrees of crankshaft revolution and also in inches of the piston travel.

MOTOR AGE has no record of the type of tappets, cams or crankshaft bearings used in the Talbot.

Installing Manifold on Ford

Davenport, Iowa—Editor MOTOR AGE—Will the installing of a Wilmo manifold in a Ford increase the mileage per gallon of gasoline and the power of the engine?

2—Is there any danger of overheating the gas—especially on hot days, on account of there being no way to regulate the heat on the thin plate separating the intake and exhaust manifold?

3—What size lamps should be used in side and tail lamps when it is desired to run these from the magneto?—H. G. Struck.

1—According to information at hand it seems to do this.

2—No.

3—These lamps should be 6-volt for the older models and 9-volt for cars from 1915 on.

Light System Burns Out

Audubon, Iowa—Editor MOTOR AGE—The Auto-Lite system on my Chevrolet 15 Baby Grand burns out the lights when the engine is running and doesn't charge the battery. What is the trouble? Publish a wiring diagram.—Soren Nelson.

Evidently the trouble with your car is caused by a short circuit of the wiring. This is probably the cause of the generator not recharging the battery properly.

If this is not found to be the cause, we would suggest that the commutator on the armature be thoroughly cleaned; also see that the brushes are in good condition and making a proper fit on the commutator. Needless to say all wire connections should be absolutely tight. If all tests are of no avail, there may be an internal defect of the generator and it should be sent to the makers for inspection.

The wiring diagram is shown in Fig. 5.

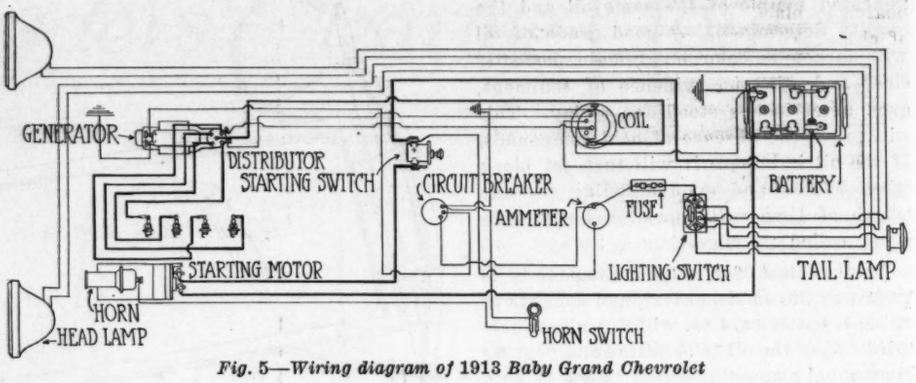


Fig. 5—Wiring diagram of 1913 Baby Grand Chevrolet

METHOD OF HEATING MANIFOLD

Worn Chain Not Likely to Cause Pounding in Engine

Malta, Ill.—Editor MOTOR AGE—Is the Lewis motor used in the Comet car; if so where and by whom?

2—Describe the Lewis motor as fully as possible.

3—Can you suggest method whereby the intake manifold of the Continental motor may be heated for low grade gasoline?

4—Is it likely that the silent chain used in the Continental motor would cause a pounding noise after being run about 13,000 miles? Is there any way to tighten this chain?—Jacob Willrett.

1—The Lewis engine is used in the Comet car.

2—This engine was thoroughly described in the MOTOR AGE issue of March 29.

3—A suggestion for this is shown in Fig. 4 and shows a sheet metal cylinder, A, which is made to fit the intake manifold and held in place to the wooden end pieces B by round-headed screws. The pieces B should be made a snug fit so that they will fit tightly upon the manifold. A hole is made in one of the end pieces into which is fitted a length of flexible tubing to connect to the exhaust pipe to convey heat from the latter. In making the cylinder A it is a good plan to first make a paper pattern and fit it around the manifold to make sure that the metal will be cut properly. To assemble the device, place the wood end pieces on the manifold and wrap the metal cylinder A around them, holding the apparatus in place by winding several turns of wire around it. Holes can now be drilled for screws in the metal and the whole device permanently fastened in place by the screws. Should any large gaps occur where the wood pieces fit around the manifold, they can be stuffed up by using asbestos yarn or some other form of packing. There are many ways in which the flexible tubing can be connected to the exhaust pipe, and one of the best ways is to make a metal stove to clamp around the exhaust pipe and fasten the tubing directly to it, having first cut a hole for the latter in the stove.

4—It is not likely that a worn chain would cause a pounding noise so much as it would a rattle caused by the chain slapping against the housing. There is an adjustable pad under the chain which can be regulated to take up wear. If, however, the chain is unduly worn, it is much more satisfactory to replace it with a new one.

Pump Is Probably at Fault

Illiopolis, Ill.—Editor MOTOR AGE—I have a 1912 model, four-cylinder, 30 hp. Chalmers that is heating very bad. We have overhauled the car and the motor runs perfect, ignition and timing O. K., cylinders clean, valves in good shape, pump seems all right. The core or honeycomb part of radiator does not heat at all, but the top, bottom and sides get very hot and the water will boil before the car has run a mile; in fact, the core is as cold as the fender or any part of car. I have used radiator cleaning compound and sal soda trying to improve the circulation of the water, but without success. What is the trouble? If radiator is clogged what can be used to clean it out? I have taken the drain cock out of bottom of the radiator and the water poured in the top runs a full stream at the bottom.—C. M. Kendall.

It is very likely that the water pump is not working properly. Or it may be a case of insufficient flow of water caused by the radiator being clogged with dirt or any other foreign matter which may have accumulated from time to time. Again it may be a combination of both cases stated above. The fact that your radiator core does not get hot may be due to the fan action. Inasmuch as the fan sweeps only a part of the radiator, naturally the shell would become very hot if the pump was not functioning properly or if the radiator was at fault in any other way.

If it seems to be a case of a clogged radiator, the latter should be cleaned out by forcing through it, under pressure, a strong solution of lye and water, after which the radiator should be flushed out with clear water.

Holding Magneto to Engine Base

Manchester, N. H.—Editor MOTOR AGE—What inherent disadvantages are there in the use of a steel strap to hold down a magneto to its base, and, if any, what percent of electric energy would be lost?—Carl S. Fuller.

A steel strap is all right for this and no electric energy will be lost if one point is carefully observed. If the magneto were strapped down on iron or steel brackets and no precaution taken to use some non-magnetic substance like brass at the point A, shown by the shaded portion in the illustration, a small amount of the lines of force will return by way of the base and bolts instead of going through the armature, as shown by the arrows. Locating the magneto in place by means of a strap as shown seems to be a favorite method, inasmuch as it makes possible quick removal of the magneto, should this become necessary.

Lining Up Wheels on Car

Grand Rapids, Wis.—Editor MOTOR AGE—Publish a description and drawings if possible describing the way to line up the wheels of an automobile.—O. Garrison.

To line up the wheels of a car, it is necessary first to run it upon a level surface and turn the front wheels in a straight-ahead position. Place four chairs or saw horses so that one of them comes at each wheel of the car and about 2 ft. ahead and to the rear of the car. Two strings are then stretched so that they will be parallel with the frame of the car, the chairs being used to support the string. The strings should come to within about 1.8 or ¼ in. of the wheel felloes and at a height either just above or below the hubs. The distance from the strings to the felloes is measured on each wheel on each side of the hubs and any mis-alignment will manifest itself in this way.

Another way would be to use straight

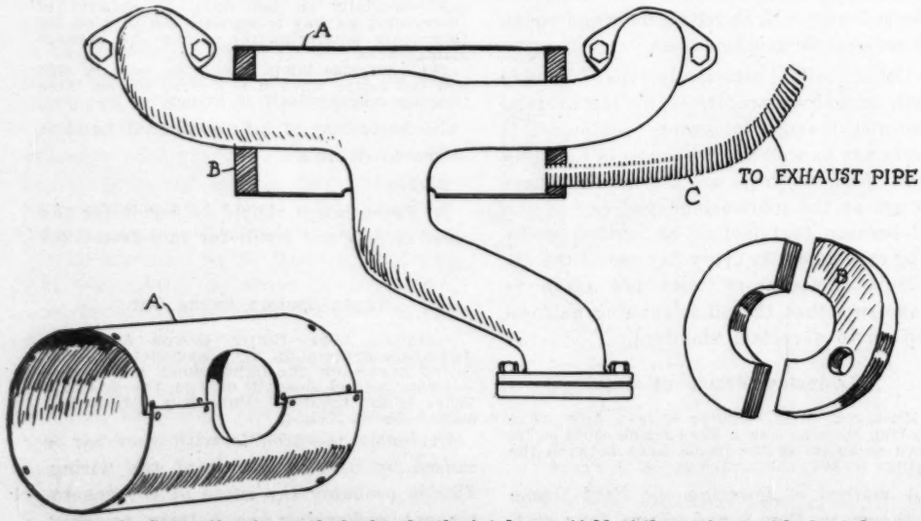


Fig. 4—Suggestion for method whereby the intake manifold of the engine may be heated

boards in place of the strings, the manner of checking the alignment being the same as in the case of the strings. Turn to page 43 of this issue of MOTOR AGE on which appears a more elaborate method of checking wheel alignment.

VARIED INFORMATION FOR READER

Erratic Running of Chandler Engine May Be Due to Dirt in the Gas Line

Tiffin, Iowa—Editor MOTOR AGE—In your issue of Jan. 4, the Mercer Automobile Co. state that their motor is capable of 3800 r.p.m. Is this correct?

2—When the maximum number of r.p.m. are given, does it mean with the load of the car? In other words, does it mean running the car or idling?

3—What should the compression be in a Chandler Six motor 3⅜ by 5?

4—Does the A. A. A. refuse to allow racing cars of over 300 cu. in. displacement to run in races that they sanction? Why are some races restricted to 300 cu. in. and others to 450?

5—Is the rear axle housing on the Peugeot racer made of aluminum? If not, what metal?

6—Give a formula for finding the speed of a car when you have the r.p.m.

7—How many camshafts has the Peugeot racing motor? Are the valves operated by rocker arms?

8—How much compression should a Ford engine have?

9—My Chandler Six misses and runs by jerks when idling, and gets worse when warmer. What is the cause?

10—How close should the valves in a Chandler be set?—F. A. Work.

1—Such speed is well within the possibilities in such an engine.

2—This does not mean that such speed is attainable with the engine under load. The only value in such figures is to show the limit of safety. If an engine is capable of turning 3500 r.p.m. or over, it means that it is extremely well balanced and well apportioned as regards valve sizes, etc., although it will not turn nearly this fast when driving the car. If you were to assume that a car geared 3 to 1 and equipped with 34-in. tires could be driven at an engine speed of 3800 r.p.m. then the car would travel about 130 m.p.h.

3—About 55-lb. gage.

4—Yes. All A.A.A. races for professional drivers are restricted to this piston displacement. It gives a more even form of competition and all in all a more satisfactory race.

5—No. The housing is pressed steel.

6—You cannot find the speed of a car by knowing the revolutions of the engine only, for the size of the tires as well as the gear ratio must be taken into consideration also.

7—Two. Yes.

8—About 55 to 60 lb.

9—This might be caused by any number of defects in either the ignition, carburetion or cooling systems. We would suggest that you look over the gasoline line and carbureter to see if by chance the erratic running is due to dirt in the line. Carbon deposits, improper seating valves, incorrect mixture, are among the other things to check up on.

10—According to the Chicago office of the company this should be about .004 in.

Wiring of Oakland

Media, Pa.—Editor MOTOR AGE—Kindly publish a diagram of the Deaco generator which was used on the 1914 model 35 Oakland touring car. In having the magnets recharged I have disconnected the wires of field and armature winding, also have lost a memoranda which I made of the poles of the magnets looking toward the coupling from the water pump whether the north or south pole was on the right-hand side. In publishing the diagram I would like to have it shown without the voltage regulator under the magnets which burnt out after about six months' running.

2—I wish to use a Delco reverse current cut-out between the generator and battery. I have tried but they act as a drag on the motor and slow it down.—Francis Richardson.

1—This was published in the Readers' Clearing House department, MOTOR AGE, issue of May 24.

2—It is impossible to tell from your pen sketch where the trouble may lie.

Converting Buick Six Into Speedster

Fort Morgan, Colo.—Editor MOTOR AGE—Illustrate the different ways in which noted racers hold their steering wheels while racing.

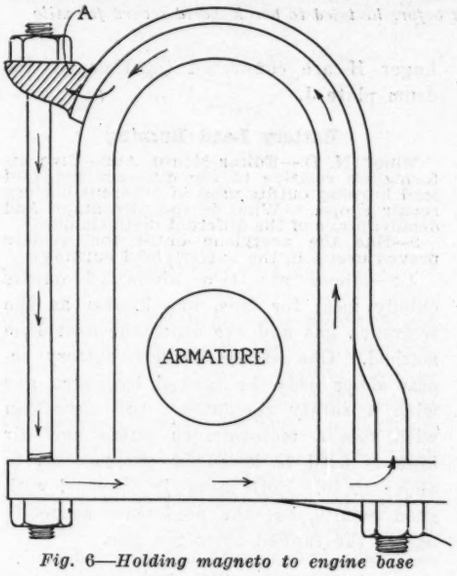


Fig. 6—Holding magneto to engine base

2—Is the new Emerson car being manufactured?

3—What is the bore and stroke of the new Emerson?

4—Give suggestions for converting a Buick Six, model 55, 1914, into a speedster.—Frederic Belle.

1—Pictures showing this were published on page 49 of the May 10 issue of MOTOR AGE.

2—No.

3—3¾ by 4 in.

4—Suggestions for this have appeared in recent issues of MOTOR AGE, and reference to these will no doubt give you some ideas as to what can be done in the way of converting earlier models into speedster types.

Wiring Coil on Michigan

Algona, Ia.—Editor MOTOR AGE—Publish wiring lighting system for Model K. Michigan.

2—Can I connect the Briggs coil to storage battery without damage to the coil.

3—How should it be connected, to both wires or one wire?—C. R. Madson.

1—A wiring diagram of this car is not available, but the Abbott-Detroit wiring diagram shown in Fig. 7 will give an idea of the layout used in the Michigan Model K, inasmuch as the cars had about the same system.

2—It is not likely that you can do this successfully.

Demand for Ford Mechanics

Pekin, Ill.—Editor MOTOR AGE—Is there any demand for first class Ford mechanics? What is the average salary?—George Lohnes.

There is no good reason why first class Ford mechanics should not be in demand, considering the number of Ford cars used. The wages of mechanics vary but usually average from about $20 to $30 per week.

Sliding Transmission for Metz

Jackson, Miss.—Editor MOTOR AGE—What make or type of sliding transmission can be used to substitute the friction drive of a Metz 1913 roadster? Where can same be obtained?

2—State the cause of the magneto burning out on a Willys-Knight Overland.—Lawrence Auto Repair Shop.

1—There is none that we know of which could be successfully installed.

2—We cannot see any reason why the magneto should burn out unless by some chance the storage battery current was sent through the coils of the magneto for too long a time. It may be that the magneto has some internal defect or that the magnets have become de-magnetized.

Not Advisable to Fit Disk Wheels

Shawnee, Okla.—Editor MOTOR AGE—I would like to rebuild my model H, four-passenger Seller into a speedster. Publish a sketch giving me an idea how it will look.

2—Where can I buy parts for this car?

3—Do disk wheels increase the speed and would you advise them on this car?

4—What kind of paint does the Chandler

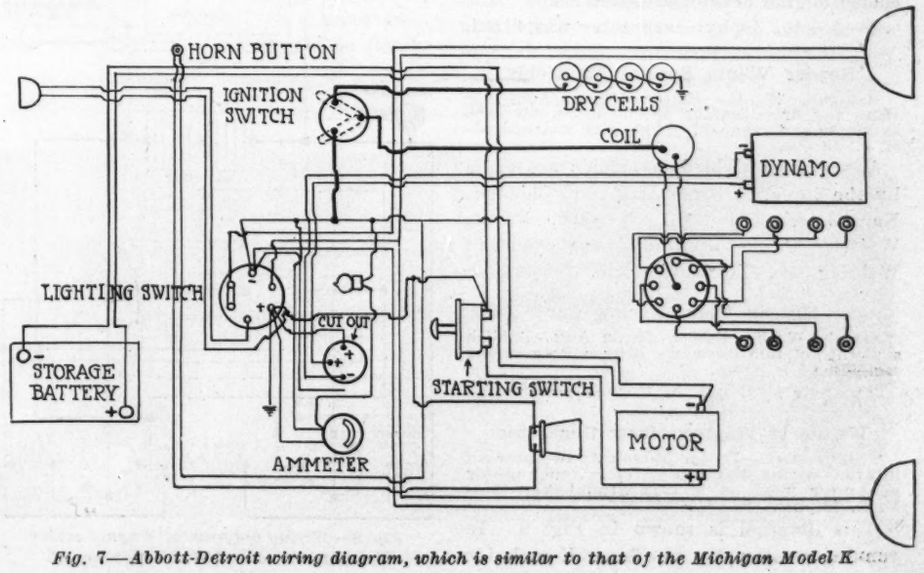


Fig. 7—Abbott-Detroit wiring diagram, which is similar to that of the Michigan Model K

Fig. 8—Bob Burman and his Blitzen Benz just before he tried to break world record for mile

Motor Car Co. use on their six-cylinder engines?—Ervin Durr.

1—Suggestions for converting old model cars into speedsters have appeared in recent issues of MOTOR AGE.

2—We have no record of this.

3—Only at very high speeds. No.

4—This is an engine enamel made especially to withstand very high temperatures.

READER WANTS PARTS FOR ZIP CAR

Used Both Air and Water-Cooled Engine During Existence

Oskaloosa, Iowa—Editor MOTOR AGE—Where can parts for the Zip cyclecar be bought? It was formerly made at Davenport, Iowa.

2—Does this have a special engine or stock? If stock, whose make, and h.p.?

3—What size carbureter is on this car, and what is the make?—Ralph Deck.

1—We have no records to show what became of the Zip Cyclecar Co. so far as the parts of their car are concerned. We suggest that you write to the various parts houses advertised in the columns of MOTOR AGE.

2—This car was originally equipped with an air-cooled V-twin Spacke motor, but later with a Hermann four-cylinder water-cooled engine of 16 hp. The air-cooled engine developed about 8 hp.

3—A 1-in. Zephyr carbureter was fitted.

Reader Wants Special Manifolds

Ashland, N. H.—Editor MOTOR AGE—Are there any firms making special manifolds such as intake and exhaust? If so, give addresses.—H. E. Jacobs.

Brazed and welded manifolds are made by the Imperial Brass Mfg. Co., Chicago; New Jersey Tube Co., Newark, N. J.; Whittier Co., Chicago and the Standard Welding Co., Cleveland, Ohio.

Blitzen Benz Racing Car

Seattle, Wash.—Editor MOTOR AGE—Publish a picture of Bob Burman's Blitzen Benz racing car.—Bob Masumoto.

This car is shown in Fig. 8.

Wiring of Wagner Motor Generator

Teague, Tex.—Editor MOTOR AGE—Show an internal wiring diagram of the Wagner motor generator used on a 1913 Studebaker 35.—V. L. Hippel.

This diagram is shown in Fig. 9. In running position the top finger K and side finger H are connected together by the drum plate J.

Battery Lead Burning

Minot, N. D.—Editor MOTOR AGE—Give information relative to the different kinds of lead burning outfits used in different battery repair shops. What is the advantage and disadvantage of the different methods used?

2—Has the acetylene outfit for welders proved useful in the battery lead burning?

1-2—There are two kinds of outfits chiefly used for this, one known as the hydrogen gas and the other the acetylene method. One of the largest battery repair shops uses the tanked hydrogen gas with a safety regulator. In connection with this a motor-driven pump and air tank is used to keep the pressure up to about 15 lb. Both methods are used with good results, but the preference seems to be for the tanked hydrogen gas.

Signs for Car Drivers

Deming, N. M., Editor MOTOR AGE—I am sending to you a picture of road signs used by the Park Garage of Deming, N. M. They tell me that these signs were suggested by like signs used by the Butler Garage at Albuquerque, N. M.

The signs are 10 by 19 in. with a 2½-ft. rod and are set in the ground about 1½ ft. The lower end is bent at the time they are set, so that they cannot be easily pulled up. Under the word "Deming" is placed the mileage. All roads leading to Deming are signed with these signs. Just before reaching Deming you come to three signs placed about 200 yds. apart. The first, "Who helped," the second, "You over," and the third, "The road? Park Garage." The rest of the signs indicate, by reference to the characters, the condition of the road. The first indicates a bridge, the second, a railroad crossing, the third a sharp chuck or wash. On the bottom row reading from the left is, first, a sharp left turn, the second, a sharp right turn, the third, a swale or wash, the fourth, railroad crossing, the fifth a right curve. They also have other signs not shown in this picture which indicate the left circle curve, etc. These signs are placed just at the edge of the roadway and at night when the glare of the light strikes them they indicate the condition of the road, giving notice to the driver. The signs are low so that there is no danger done by the wind or animals. They are placed about 150 to 200 ft. from the corner or from the point in the road to be marked.

It has seemed to the writer that this system of signs well might be used in other localities as a help to the tourist. In addition to these signs the Park Garage also conducts an auto tourist's camping ground, which is free to all auto tourists. These signs are shown in front of the Featherston Paint Shop, and show the painters.—Fred Sherman.

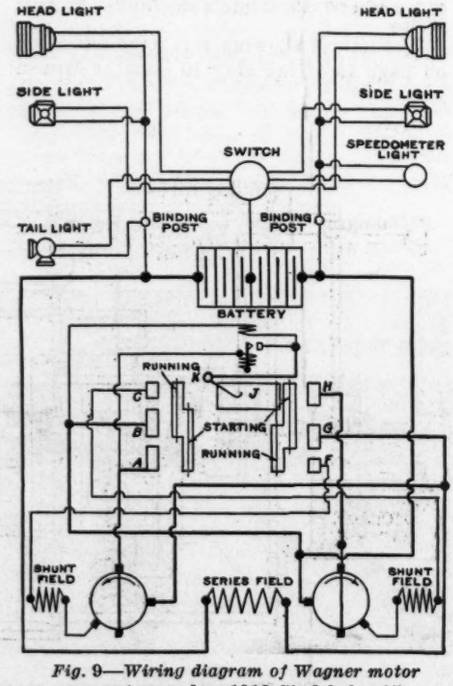


Fig. 9—Wiring diagram of Wagner motor generator used on 1913 Studebaker 35

This Engine Not Made

Tucson, Ariz.—Editor MOTOR AGE—What engine has the greatest r.p.m.; its hp. and number of cylinders?

2—Is any engine made with 12 cylinders in a line cast in single block?

3—What is the price of the Fageol car of Oakland, Cal.? Also what is the factory output?—Orr Jones.

1—This is not definitely known.

2—No.

3—The production of the passenger car was stopped on account of the government needing the Hall-Scott aviation engine with which the Fageol was equipped.

Wants Book on Vulcanizing

Hanover, Pa.—Editor MOTOR AGE—Where could I get a treatise on vulcanizing?—Henry W. Stick.

Write to the United Publishers Corp. Book Co., 241 West Thirty-ninth street, New York City.

Can Flaxseed Be Removed?

Barnwell, S. C.—Editor MOTOR AGE—Is there any way to clean a radiator which has been filled from time to time with corn meal, flax seed and other similar things used to prevent radiator from leaking?—J. J. Vickery.

We know of no direct remedy for this, but suggest that you introduce under pressure a saturated solution of washing soda

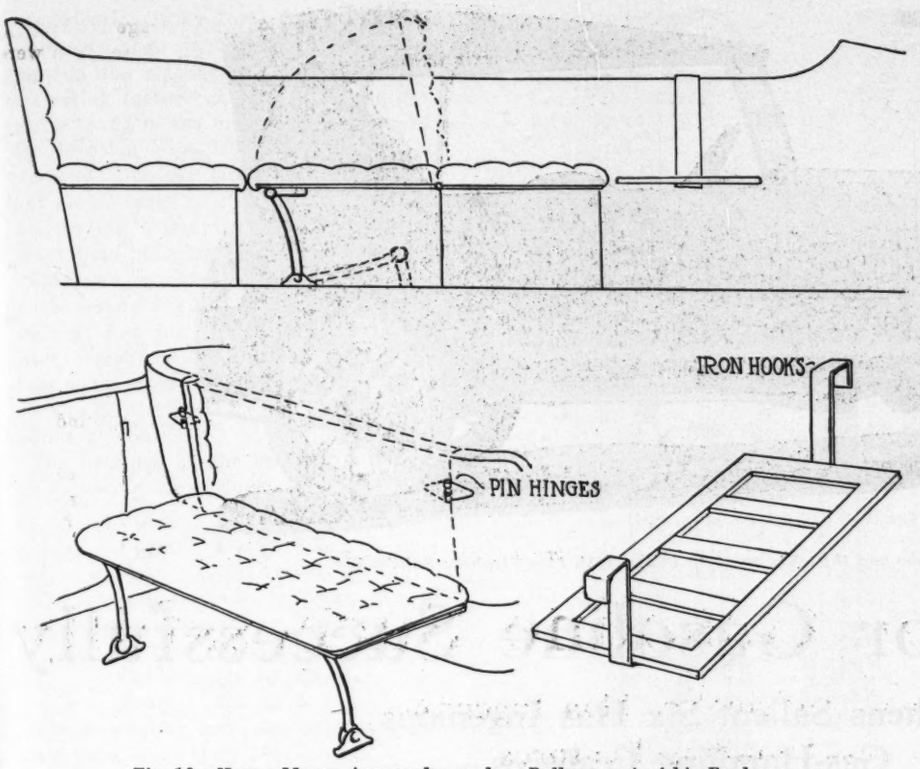


Fig. 10—How a MOTOR AGE *reader made a Pullman out of his Ford car*

in water. Another method is to wash the radiator with a strong solution of lye in water and before the liquid has a chance to evaporate completely wash the radiator with clear water thoroughly. The lye will tend to loosen the foreign matter.

SLEEPING IN THE FORD CAR

Accomplished By Hinging Front Seat Back and Adjustable Foot Rest

Spokane, Wash.—Editor MOTOR AGE—I was much interested in the account of the cutting down of the front seat of a Ford in order to make it possible to sleep in the car. I changed mine that way and frequently go out to some of the nearby lakes, make up my berth and turn in for a sleep preparatory for the morning fishing. I take my bedding along in a canvas Klondike sack, which keeps them clean and dustless. I have two hinges on the back of my front seat and found no trouble at all in running a hack saw blade around marks I made to show where the seat was to be cut. I also have a foot-rest in the rear compartment of the car, which when thrown back fits the front seat back when let down so as to let the cushions all rest on a level. To hold the front seat back in place when up, I use a pin hinge on each side. When the pins are in place there is no spread or rattle.

I found that the car was not long enough inside to stretch out full length, and to make this possible I took the hinges off the board that is under the front seat cushion over the gasoline tank and put hooks on each end in such a manner that when they are hooked over the front doors, when closed, the board rests on a level with the seat cushions and this gives ample room to stretch full length. The hooks are lined with leather and when this board is put back in place under the front seat cushion, the hooks are wrapped in rags or cloth so that they will not rattle against the ends of the gasoline tank. To hang up clothing, etc., tuck them under the top bows. It is, of course, understood that there is just about room enough for two average persons to sleep in a bed of this kind.

I found that measuring down about 14 in. from the under side of the wood upholstery strip of the back seat, gave about the proper place to saw the front seat back. By wrapping the hack saw blade with friction tape and running the teeth of the saw the reverse of ordinary so that the cutting stroke will be towards, instead of from you, the back can be cut out very easily. Be sure, however, to make a paper template of the seat edges and have the wood reinforcement pieces cut out by a band saw. Mine are about 1¼-in. thick.—J. E. Bates.

Changing Drive Gears on Buick

Clifton, Ariz.—Editor MOTOR AGE—My 36 B. Buick 1914 car is geared 3½ to 1. I would like to change this to about 4 to 1. The ring gear has 53 teeth and the pinion gear has 15 teeth. As I understand that you can adjust the ring gear towards or from the pinion gear, I would like to know why it is not possible for me to use a 13 tooth pinion gear on this same ring gear. The Buick agency informed me that I would have to change both gears—the ring gear they would supply me would have the same number of teeth, but the pinion gear would have only 13 teeth.—W. H. Monroe.

You cannot change the ring gear without also changing the pinion on drive shaft as the pitch would not be the same and the gears could not be made to mesh.

Wants Substitute for Water

Pampa, Tex.—Editor MOTOR AGE—Give formula of a cooling compound used in racing cars instead of water.—Palace Garage.

Nothing is ever used as a substitute for water.

Compression Knocks in Engine

Berkeley, Cal.—Editor MOTOR AGE—What is meant by compression knock? My 1917 Model N. Hupmobile developed quite a knock when going up a grade of about 8 percent. I thought it was a spark knock, but the service mechanic said it was a compression knock and that he would have to bore out the plugs over the intake and exhaust valves. I would not stand for this. I wrote to the factory and they sent a set of low compression plugs which did not help eliminate the knock. I wrote again and they said it was a compression knock, but did not explain what that meant.

2—Can a common piston ring be fitted to a cylinder without taking off the block, and fit it right when the cylinder head is not detachable?—George Grimshaw.

1—A compression knock is caused by an engine having too high compression as you have probably assumed.

2—No.

Sixteen-Valve Head on Overland

Faribault, Minn.—Editor MOTOR AGE—I wish to equip my model 85-4 Overland with a sixteen-valve head on the original engine. Would you recommend this change?

2—What company makes this?—H. W. Lawler.

1—No. The expense would not warrant it.

2—We know of no concern that makes a sixteen-valve head to fit an Overland but suggest that you write to Robert M. Roof, Anderson, Ind., who makes an overhead valve system for the Ford car.

Error in Equation

Attention is called to a mistake in the equation at the bottom of the third column on page 40 in the May 31 issue of MOTOR AGE. If A in the equation is the combined area of the two surfaces in contact, the figure 2 in the numerator should be taken out. This was in answer to an inquiry from O. W. Heck, Antigo, Wis.

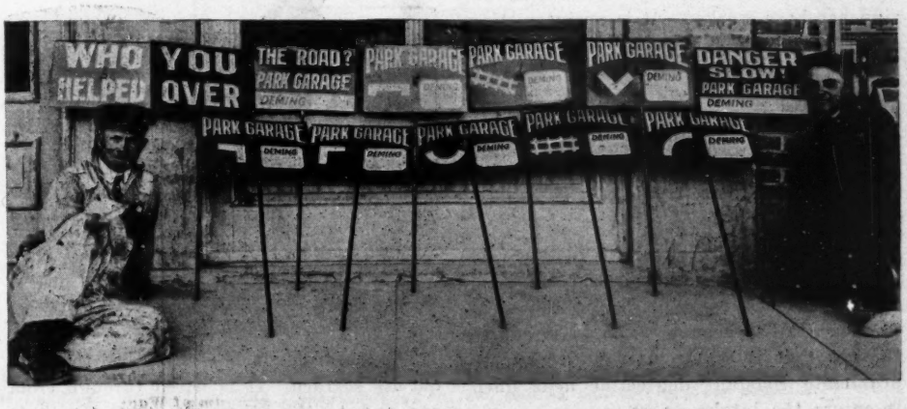
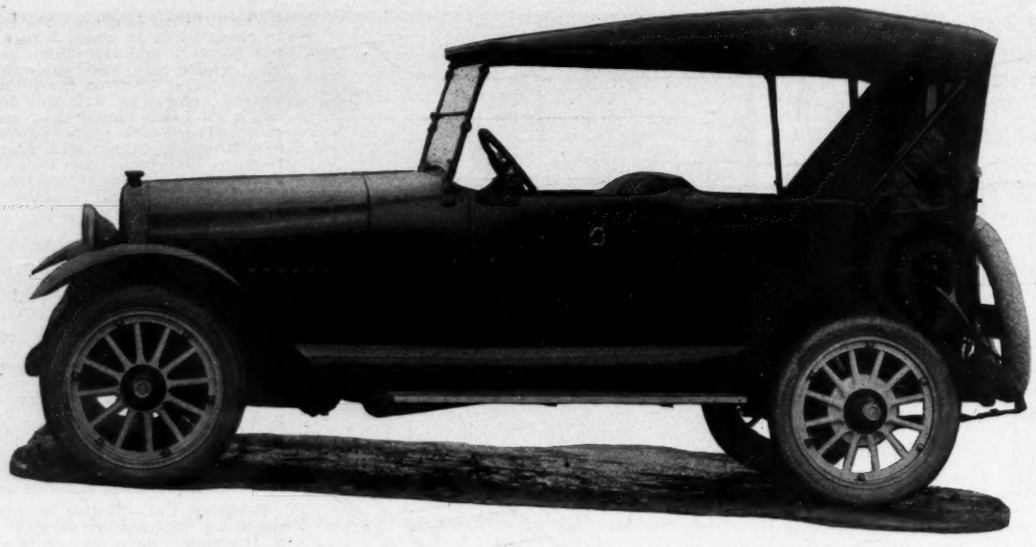


Fig. 11—Road signs, used by the Park garage of Deming, N. M.



The lines are low and the seats are deep in the 1918 type Stephens Salient Six

Handles Poor Gasoline Successfully

Stephens Salient Six Has Ingenious Gas-Handling Features

A SCIENTIFIC embodiment of the intake manifold with the cylinder head, together with a machined manifold and an unusually short distance for the gas to travel to the farthest cylinders makes the new overhead-valve Stephens Salient Six a car of unusually flexible performance. The chassis supplants the previous six which had another make of engine. It is known as the 1918 type and is offered in five-passenger touring car and three-passenger roadster at $1,385.

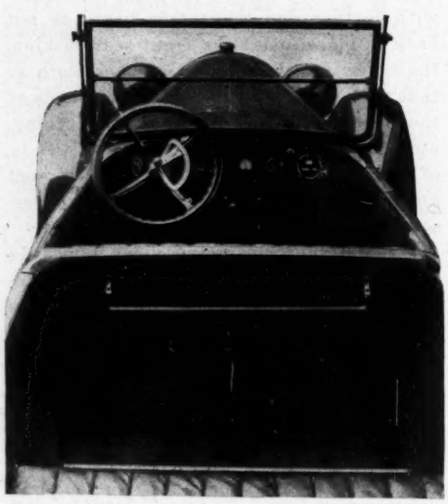
The engine is of unique construction in that it is made up of five main components, a valve-carrying head, a manifold-carrying head, a cylinder head and a valve compartment cover, all separate units besides the oil pan.

Designed for Heavy Fuel

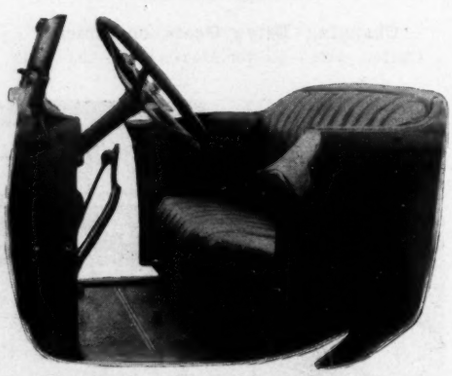
The units which handle the intake and exhaust of the gases were designed with a view of handling the present low-grade fuel and burning all of the gas, permitting rapid acceleration and a very commendable degree of flexibility. How this design has been worked out is an interesting study.

The main cylinder casting is block cast. On this is mounted the manifold casting, also of gray iron. The Stromberg carbureter is bolted directly to the side of this casting. Above this is the top casting which embodies the overhead valves, rocker arms, etc.

The gas has a very short distance to travel from the carbureter to the manifold as will be seen by a glance at the cross section. It has been the aim to so course the gas that it will remain under an approximate constant degree of heat until it enters the intake valve.



Looking ahead from the rear of the 1918 Stephens. Note the parcel lockers



The depth and comfort of the Stephens front seat is evident in this illustration

The manifold itself is machined throughout its surface. It is bored through from one end to the other and then the ends are plugged tightly with wooden plugs, making a straight-line manifold perfectly smooth and evenly heated. It seems quite improbable that any gas could condense in this manifold once the engine had reached a correct operating temperature.

Although the bore of the engine is only 3¼ in., the valves are 1⅝ in. in diameter. This is another factor which tends to make the engine one of high volumetric efficiency. To obviate the use of heavy valve springs with these large valves, two springs are used, one within the other. These springs are of different weight and, consequently, of different period of deflection, meaning that one imparts a shock-absorbing effect on the other. The combination gives a valve spring which is quick in operation and yet seats lightly. All this makes it possible to open the throttle wide from 2 m.p.h. and accelerate rapidly without choking.

Easy to Adjust valves

As previously stated the overhead-valve arrangement has its own separate casting. It is a simple rocker-arm assembly with an ingenious valve-adjusting feature. The rocker arms may be raised or lowered by turning a screw which may be easily reached from the top of the engine. Thus, a screw driver is all that is necessary to adjust the valves.

The engine is a product of Root & Van-Dervoort, Moline, Ill. It has a 3¼-in. bore and a 4¼-in. stroke with an N.A.C.C. rating of 25 hp. and a dynamometer performance of 57.3 hp. at 2670 r.p.m.

The pistons are of cast iron, scientifically designed for light weight with three plain rings.

Lubrication is by force feed. There is a pressure gage on the dash and a level gage on the side of the crankcase. An interesting feature of the lubricating system is found in the breather arrangement. The breather pipe leads directly to the overhead-valve compartment. This means that all oil spray is utilized in lubricating the moving parts in this compartment rather than being sprayed about the hood.

There are only three visible moving parts on the entire engine. These are the fan, fan belt and fan pulley. The overhead-valve compartment is capped over by a sheet-metal case. The fan is four blade and the belt of the V-type. Cooling is by thermo-syphon.

The bearings of the crankshaft are of the following dimensions:

Front	2⅛ by 2 3/16.
Center	2¼ by 3⅛.
Rear	2¼ by 3¼.

The three camshaft bearings are of equally large proportions. The sizes are:

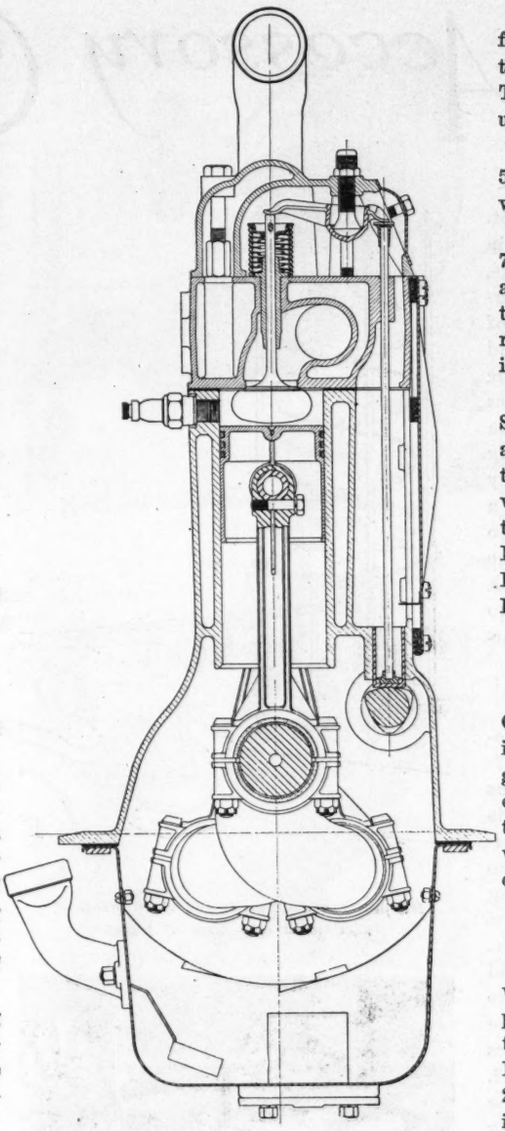
Front	1½ by 2.
Center	1½ by 1¾.
Rear	1 by 3.

The connecting rods are babbitted and brass lined, size 1½ by 2½.

As previously stated the valves are 1⅝ in. in the clear. They have a ⅜-in. lift.

With the exception of the engine and a distinctly new design of the body, the car retains most of the principles of design of the previous chassis. There is now a Borg & Beck clutch, spiral-bevel drive and roller bearings in the front wheels instead of the cones.

The carbureter is a 1¼-in. Stromberg with hot-air attachment. Starting, lighting and ignition is Delco with Bendix drive on the starter, and there is a Willard battery.



A tubular propeller shaft takes the drive from a three-speed gearset and transmits through spiral bevels to a floating axle. Torque and propulsion effort are taken up by the Hotchkiss principle.

The springs are 37½ in. in front and 53½ in the rear, both semi-elliptic. The wheelbase is 117½ in.

Two body styles are offered, the model 75 which is a five-passenger touring car, and the model 70 which is a one-seated three-passenger roadster. Both models are roomy with deep, soft French-piped Turkish upholstery.

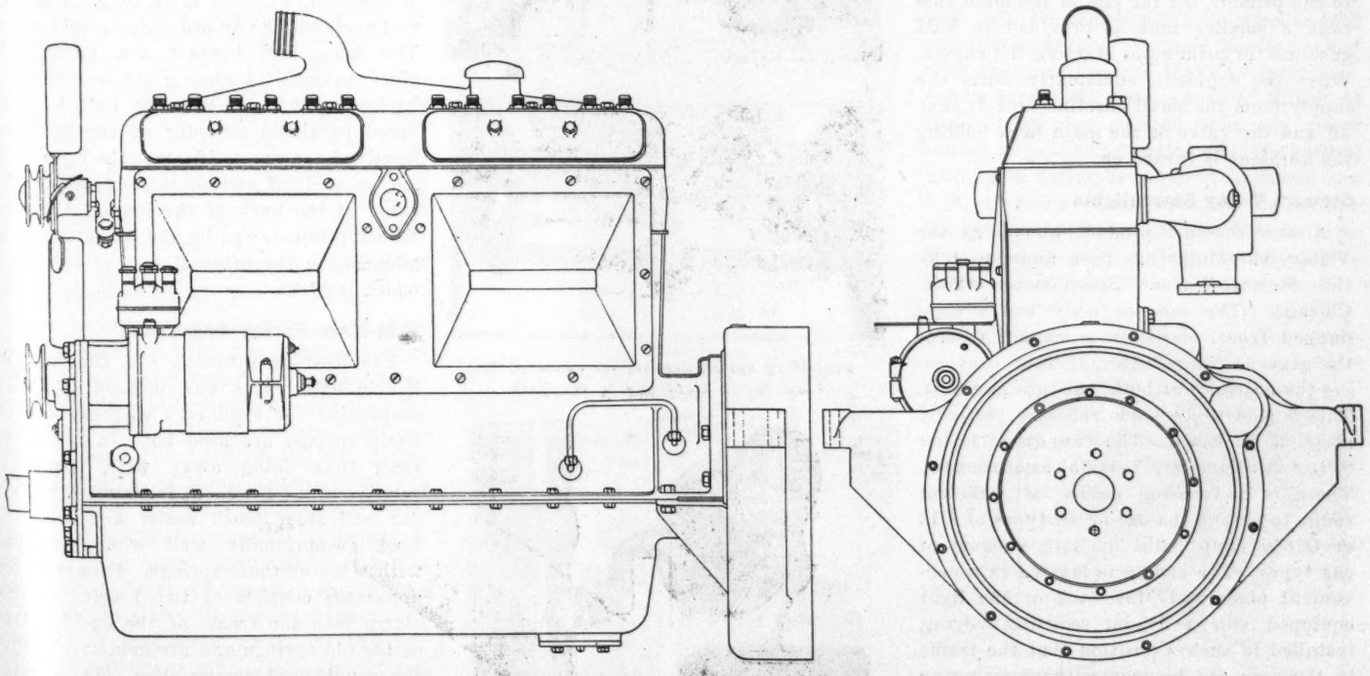
Included in the equipment are a Van Sicklen speedmeter driven from worm gears at the rear of the gearset and a Kellogg tire pump direct connected to the gearset with a hose conection in a flush plate on the floor board. The price is $1,385 f.o.b. Freeport. The car is the product of the Freeport Motor Branch of the Moline Plow Co.

CHALMERS HOLDS MEETING

Detroit, June 18—The Chalmers Motor Co. is holding a meeting to-day of sixty of its largest distributors and branch managers and fifteen zone managers who will consult with Chalmers officials and review the new series of Chalmers bodies, which were recently announced in the last issue of MOTOR AGE.

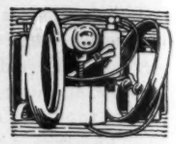
FORD PASSES 2,000,000 MARK

Detroit, June 18—Thursday, June 14, was a record day at the Ford Motor Co. plant, as it witnessed the production of the two-millionth model T Ford car, the Ford Motor Co. having manufactured exactly 2,000,000 of its cars between the time of its inception and last Thursday.



Above is a cross-section view of the Salient Six showing the location of the intake manifold in the center of the head. Note that all valve mechanism is inclosed. Below, side and front views. The fan, pulleys and belt are the only visible moving parts

The Accessory Corner



Vulcan Replacement Springs

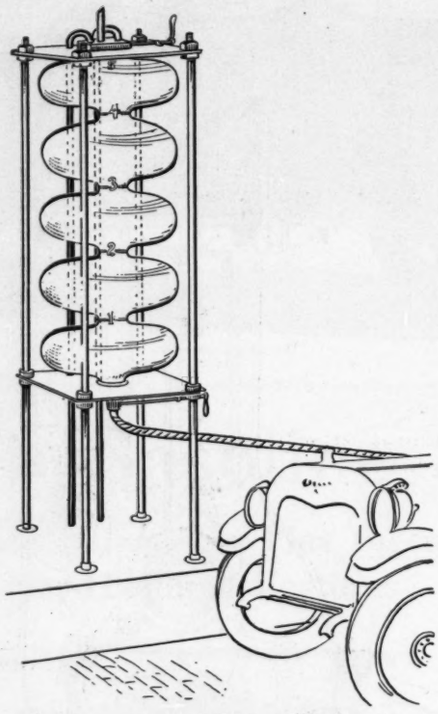
THE Jenkins Vulcan Spring Co., St. Louis, Mo., states that it carries in stock a total of 90,000 replacement springs, covering 588 different types for all popular-priced cars. Vulcan springs are made of fine grain steel, carefully heat-treated and tempered in oil, showing a high elastic limit and long life, it is claimed. The eyes of Vulcan springs are reamed for the spring links, and the springs are thickly graphited between the leaves before they are assembled. All springs are given a coat of black paint. To dealers who buy an assortment of twenty springs, the company gives a useful display rack. A smaller rack capable of holding thirty-two springs is furnished with an assorted order for twelve springs.

Lamar Kerosene Vaporizer

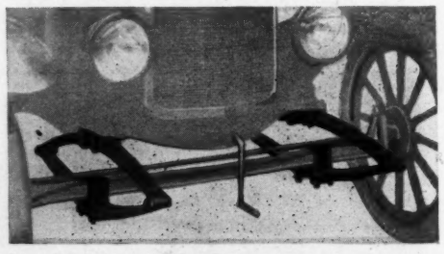
This system of vaporization uses gasoline in starting or priming the engine after which kerosene is used for continuous running. More power to the engine is claimed by the use of the Lamar vaporizer, as well as greater mileage. It is also claimed that carbon deposits and fouling of the plugs are negligible factors when the engine is equipped with this vaporizer. The device consists of a special manifold and means of heating it. No new holes are bored for attaching the manifold and the bolts which hold it in place use the holes that were used for the original manifold. The only holes needed are two through the dash to accommodate the ¼-in. pipe going to the primer. At the end of the main fuel tank a smaller tank is provided to hold gasoline for priming or starting the engine. When the engine is sufficiently warm the supply from the small gasoline tank is shut off and the valve of the main tank holding the kerosene is turned on.

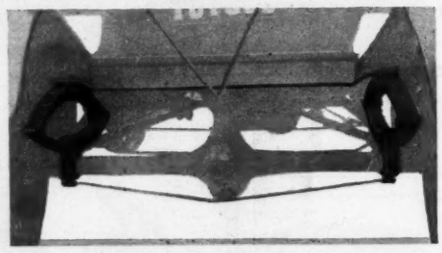
Stewart V-Ray Searchlights

A new Stewart product known as the V-Ray searchlight has been announced by the Stewart-Warner Speedometer Corp., Chicago. The case or body has a solid flanged front, closed in a manner to seal the glass to the reflector, thereby preventing the entrance of both moisture and dust. This is said to keep the reflector perfectly clean at all times. The case itself is but 6 in. in diameter, outside measurement. There is a focusing device of sufficient range to permit the use of all types of G12 or G16½ lamp bulbs of both vacuum or gas types. The switch is located in a convenient place and the back of the light equipped wih a 3½-in. reducing mirror, installed in such a position that the traffic in the rear can be seen without swinging the lamp into the car. The mirror is furnished at no extra charge. The V-Ray searchlight is supported below the bracket instead of above. It has been learned, it is said, that when the spot light is supported above the bracket, the light easily vibrates out of position. When hanging below the bracket, it is declared that it cannot vibrate out of position and presents perhaps a more pleasing appearance. Other features include mounting of the joints so that no lubrication is required and a universal bracket which fits practically every type of windshield. The lamp is neat in appearance and small in size, making possible the use of two searchlights, one on either side of the car, in place of headlights or dimming devices; so designed that it can be installed on either right or left side of the windshield without alteration of the bracket and so shaped that storm curtains can be fastened to the windshield around the bracket. The outfit is finished in black enamel with nickel trimming.



Harper measuring device for gasoline, used with any kind of pump





Rest-More spring suspension adjusted to Ford car in front and in the back

The Howe concern has added this model, the Junior No. 15 spotlight

Auto-Reel Spotlight

A motor car lamp that can be used as a spotlight, trouble lamp or driving light and called the Auto-Reel spotlight is made by the Anderson Electric Specialty Co., Chicago. The adjustable cord reel is located in the ball casing just back of the lamp and forms a part of the bracket. When in the position shown, the lamp can be used as a spotlight or driving light. To use as a portable light, it is only necessary to unscrew the knurled nut and withdraw the lamp to any desired length up to the limit of the cord, which is 12 ft. long. The cord reel operates like an ordinary curtain roller. The lamp and bracket are finished in black enamel. A clear glass lens is fitted backed by a 21 cp. nitrogen bulb in a silvered parabolic reflector of carefully determined contour to increase the light rays. An on and off switch is conveniently located at the back of the lamp. A 3½-in. reducing mirror can be had for 50 cents in addition to the original cost of the lamp, which is $7.50.

Rest-More Spring Suspension

The Rest-More Spring Co., Ottawa, Ill., has brought out a new method of spring suspension for Ford cars whereby full elliptic springs are used both in front and rear, thus doing away with the cross springs of the Ford. It is claimed that the car will steer much easier and hold the road exceptionally well when equipped with a set of these springs. Primarily the apparatus consists of two forgings which clamp into the frame of the car in place of the old springs and are held in place by the usual Ford spring clips. These forgings extend outward to a width somewhat greater than that of the frame, being also

bolted to the latter at the points where the fender brackets are fastened to the frame. This arrangement does away with the front radius rods and is said to make the front axle very rigid. The springs on the front axle may be either underslung or placed above the axle, the casting on the axle being held in place by an extension that fits into the hole occupied by the old spring perch. The rear springs are fastened in about the same way, the axle saddle having an extension at the bottom for a truss rod. A complete set of four springs sells for $35. If desired, a half set can be purchased for $17.50.

New Howe Spotlight

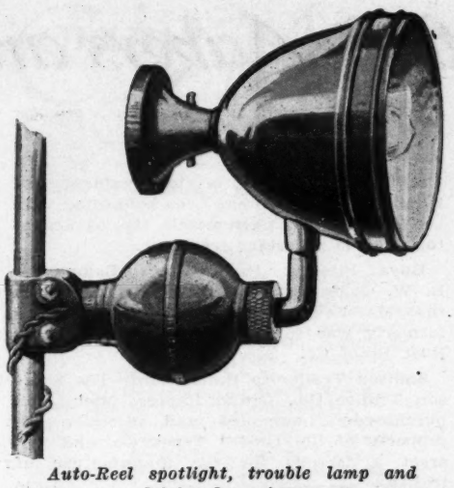
The Howe Mfg. Co., Chicago, has added a new model called the Howe Junior No. 15. It has a 4-in. rear view mirror and sells for $4.75. The same lamp without the mirror sells at $4. The new lamp has the same bracket as the larger Howe lamps and has a spring controlled arrangement, which enables the driver to utilize his light quite easily. The strong ray can be directed to any spot that the driver wants to see, then remains stationary just where it is placed, because the springs exert a constant pressure on the turning joints. All wear is also compensated, it is stated, definitely. The Howe light provides, without extra charge, two-piece detachable clamps for attaching the lamp to any windshield post; round, square, or oval. Jars and vibration do not affect the position of the lamp, it is claimed. Loosening one set screw detaches the clamp and the spotlight can be used as a trouble lamp.

Protecto Spark Plug

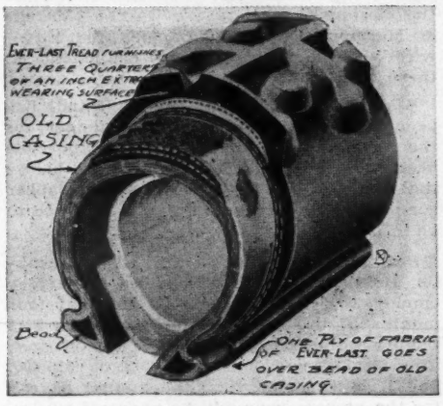
The porcelain insulato is entirely inclosed on this plug, the outer shell being of steel fitted with a fiber cap. The porcelain, which is a petticoat design, is protected against breaking, short-circuiting and too tight adjustment when attaching the cable, inasmuch as the porcelain is entirely separate from the upper parts of the plug. There is a gap in the electrode just above the porcelain, which is designed to intensify the spark. The price is $1.50. Vital Mfg. Co., Cleveland, Ohio.

Ever-Last Tire Tread

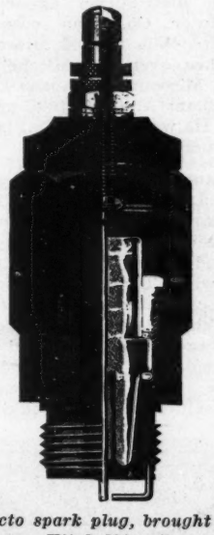
This tread is composed of Standard 17¼-oz. tire fabric, with improved form of breaker strip and tread. In construction it is much like an ordinary tire, in that the side walls of the tread extend down entirely around the bead of the tire to be retreaded and are thus held firmly by the rim. Tires to be retreaded with the Ever-Last tread must be sent to the manufacturers of the latter who will remove the worn rubber from the tires and cement the new tread in place. A cold cure process of vulcanizing is used to vulcanize the tire and tread. Three safety factors are claimed by the makers of this tread against slip, heat and creep. First, the cementing process firmly holds the tread in place. Second, and third, the rim and the pressure within the tire makes such a firm construction that it cannot move and the tread will, with the cement used, vulcanize itself to the tire, making it an integral part of it. By putting on an Ever-Last tread ¾ in. is added to the wearing surface of the tire, eliminating to a great extent the possibility of puncture. The old casing is entirely hidden when the tread is applied and the tire has the appearance of a new one. The Ever-Last Tread Co., Indianapolis, Ind.



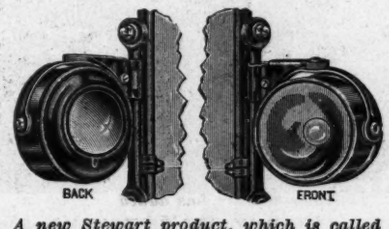
Auto-Reel spotlight, trouble lamp and driving lamp in one


EVER-LAST TREAD FURNISHES THREE QUARTERS OF AN INCH EXTRA WEARING SURFACE
OLD CASING
ONE PLY OF FABRIC OF EVER-LAST GOES OVER BEAD OF OLD CASING

Ever-Last tread, composed of 17¼-oz. tire fabric



Protecto spark plug, brought out by Vital Mfg. Co.



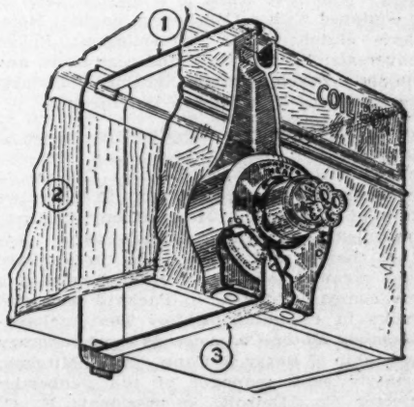
A new Stewart product, which is called the V-Ray searchlight

Harper Gasoline Measuring Device

An apparatus that will enable motorists to see the gasoline they purchase while it is being measured has been brought out by J. Harper of Dallas, Tex. The device has a glass measure with a graduated scale, showing gallons. The fluid enters the glass container from the top and is allowed to flow until the desired amount is registered on the graduated scale. The stopcock on the top is then closed and the one on the bottom opened, allowing the fuel to run into the gasoline tank. The device may be used with the pumps and measuring machines now in use, or with any kind of plain fluid pump. It has an attachment that will allow the air in the container to escape as the gasoline enters, and vice versa. It also has an overflow pipe leading back to the underground tank, which eliminates the necessity of being careful to stop pumping when exactly 5 gal. have been placed in the container.

Neal Ignition Lock for Fords

This lock consists of a steel band completely encircling the coil box and secured by a Yale lock. The Neal lock securely locks the switch and the coil box when the ignition is turned off by means of the lock key. It is impossible to wire around the switch because the coil box is locked with the steel band so that the cover cannot be taken off. On account of this steel band it is also claimed that the cover cannot be pried or jimmied off. No wiring, drilling or fitting is required to install the lock, it being necessary only to remove the present plate on the coil box switch. The price is $3.50. Hall Hardware Co., Indianapolis, Ind.



Neal ignition lock for Ford cars

Among the Makers and Dealers

CLAY Is Abbott Sales Manager—W. G. Clay has been appointed sales manager of the Abbott Corp., Cleveland, Ohio.

Becomes U. S. Tire Branch Manager—W. H. Taylor of Chicago has been appointed resident manager of the Peoria, Ill., branch of the United States Tire Co.

Michigan Trailer Files Bankruptcy Petition—The Michigan Auto Trailer Co., Detroit, has filled a petition of bankruptcy; liabilities $5,993.31; assets $10,088.27.

Hupp Is 600 Cars Behind—The Hupp Motor Car Co. is 600 cars behind in its deliveries. The company is producing cars as rapidly as materials markets allow.

Staude Does Patriotic Plowing—A Staude Mak-a-Tractor prepared the community garden of 14 acres in St. Paul, Minn. This tract will provide fifty-five families with gardens.

Budd Wheel Leases More Space—The Budd Wheel Corp., Philadelphia, Pa., has leased the ground floor of the Quaker Lace mill for manufacturing and office purposes. The company is subsidiary to the Budd Mfg. Co., maker of all-steel motor car bodies.

Will Retire Some Preferred Stock—The Willys-Overland Co. will retire 4500 shares of preferred stock July 1. These shares will be bought at the market price. The company's charter calls for the retirement of 3 per cent of all outstanding preferred stock this year.

Thermoid Rubber Increases Output—Through the addition of a new hydraulic press the Thermoid Rubber Co., Trenton, N. J., has increased its yearly output of Thermoid hydraulic compressed brake lining nearly 30 per cent. The department is running overtime at full capacity, averaging 37,000 feet output a day.

Hewitt Rubber Enlarges—The Hewitt Rubber Co., Buffalo, N. Y., will increase its capital stock from $500,000 to $1,000,000, and J. H. Kelly and F. V. Springer of the Republic Rubber Co., Youngstown, Ohio, will become associated with H. H. Hewitt in the management and control. Plans are contemplated for the enlargement of the plant to a capacity of 5000 tires a day.

First Oneida Truck Is Produced—The first Oneida truck to be manufactured by the Oneida Motor Truck Co., Green Bay, Wis., incorporated recently with a capital stock of $300,000, left the shops Wednesday, June 6, and marked the beginning of the initial output of commercial cars by the new company. The first truck is a 1½-ton car. It is equipped with a Continental engine; Hele-Shaw clutch; Cotta transmission; Spicer universals; Timken front and rear axles, and complete Bosch ignition, lighting and starting systems. Worm-drive is employed.

Controls California for Packard—Earle C. Anthony, Inc., Los Angeles, Cal., has arranged with the Packard Motor Car Co. to represent the Packard company in the entire state of California. Mr. Anthony formerly controlled Southern California only. Another change of importance in the Packard sales organization is the establishment of a new company to deal in Packard cars and trucks in Columbus, Ohio. The Packard-Columbus Motor Co. succeeds the temporary dealership of Barry B. Cann. R. H. Mitchell, formerly sales manager of the Penberthy Injector Co., Detroit, is president; E. C. Brisley, for several years a salesman in the Detroit retail branch, is vice-president, and R. M. Mitchell, who has been connected with the Lackawanna Automobile Co. of Scranton, Pa., is secretary-treasurer.

Buys Interest in Castings Company—B. W. Collins has purchased an interest in the Marshall Castings Co. Mr. Collins formerly was sales manager of the Parker Rust Proof Co.

Samson Trailer to Build Plant—The Samson Trailer Co., Grand Rapids, Mich., has purchased 10 acres of land adjoining the property of the United Truck Co. and will erect a factory for the manufacture of trailers.

Marmon to Use Hayes Wheels—Fred E. Castle, of the Fred E. Castle Co., announces the closing of a contract with the Nordyke & Marmon Co. of Indianapolis for Hayes wire wheels, which will be equipment on these cars for 1918.

Ajax Promotes Brandt—E. H. Brandt has been appointed western sales manager for the Ajax Rubber Co., Inc. Mr. Brandt has been with the Ajax two years and before that was for nine years with another rubber company. His headquarters will continue to be in New York.

Franklin Increases Workers—The Franklin Automobile Co. has increased its factory employees by 26 per cent in the last four months of this year and now employs 2742 factory workers besides 340 office employees. The weekly payroll now averages $73,000, and it is expected that the annual payroll for the present year will be about $3,640,000.

Stanger Organizes Mitchell Agency—Wesley A. Stanger, who went to St. Louis from Chicago several months ago to organize the southwestern distribution agency for the Ben-Hur Motor Co., has organized the Mitchell Automobile Co. of Missouri. This company takes over the Mitchell interests in St. Louis, Missouri, Arkansas and part of Illinois. William A. C. Halwe, president of the William Halwe Grocery Co., is secretary of the new company.

Fageol Plant Opens—The Fageol Motors Co. celebrated the starting of its new $500,000 motor car, truck and tractor factory, June 9. The day was celebrated by a program arranged by the Chamber of Commerce of Oakland, which included a business men's lunch, motor car parade, addresses by Mayor Davie of Oakland, Frank R. Fageol, secretary of the Fageol Motor Co., and by Joseph H. King, president of the Oakland Chamber of Commerce. These were followed by flag raising and salute, ground breaking, motor car race of cars fifteen years or more older, a speed race with two Fageol cars participating and a demonstration of the Fageol tractor.

Myers to Manage Amazon Sales—L. J. Myers has been placed in charge of sales for the Amazon Rubber Co., Akron, Ohio.

Bicknell With Carter at St. Louis—G. M. Bicknell has been appointed sales engineer of the Carter Carburetor Co. of St. Louis, Mo., and will have charge of factory sales for Detroit.

Globe Tire to Produce Soon—Operations are going forward in the factory building of the Globe Tire Co., Laporte, Ind., and it is expected the company will be ready to commence work in ninety days.

New Wire Wheel Company Is Organized—The Kalamazoo Wire Wheel Co. has been organized at Kalamazoo, Mich., with a capital of $500,000. The company will manufacture wire wheels for motor cars and will erect a plant within ninety days, which it is expected will manufacture 400 sets of wheels a day and employ 300 men.

Franklin Ships $2,080,580 Worth in May—The Franklin Automobile Co., Syracuse, N. Y., shipped three and a third times as many cars in May, 1917, as in May, 1916. Shipments reached thirty-seven cars a day, and the total showed an increase over April of 86 per cent. Unfilled orders increased to 2200. The value of the May shipments was $2,080,580. June shipments are being made at the rate of forty-one cars a day.

Milwaukee Dealers to Tour Again—A tentative route for the second annual booster tour to be conducted by the Milwaukee Automobile Dealers, Inc., in August to stimulate interest in the Wisconsin State Fair, at which the association again will have a motor show, has been selected. The route calls for a six-day tour, as follows: Milwaukee to Janesville; Kilbourn and the Dells; Waupaca; Menasha and Milwaukee. It covers about 950 miles.

Smith Dealers Gather at Savannah—Representatives of the Smith Form-A-Truck and the Smith-Form-A-Tractor gathered recently at Savannah, Ga., from several points in the South to attend a demonstration of the tractor. The demonstration was under the immediate care of Youngglove and Sipple, who represent in twelve counties the distribution of this appliance. The Southern campaign of education so far has included demonstrations at Knoxville and Memphis, Tenn.; Atlanta and Waynesboro, Ga., and Columbia, S. C. These will be continued until such time as all important agricultural

ARMY USE OF TRUCKS—Some idea of the number of White trucks in the Unit at Ford Bliss, Tex. Most of the trucks were with the punitive expedition into Me

districts have been shown the efficiency of the tractor. The meeting was presided over by L. A. Woodward, manager of the Southern territory, with headquarters at Atlanta.

New Michigan Motor Plant—The Napoleon Motor Co. of Napoleon, Ohio, will move its plant to Traverse City, Mich., soon. The company states that it has orders for 5000 passenger cars and 300 trucks.

Porter Becomes Globe Sales Manager—Charles R. Porter, for several years identified with the motor truck trade in St. Louis, has been named sales manager for the Globe Motor Truck Co. of East St. Louis, Ill.

Absorber Company Bankrupt—The National Shock Absorber Co., Grand Rapids, Mich., has filed a voluntary petition of bankruptcy with $3,669.55 liabilities and $9,905.05 assets, the latter representing the book value of stock and accounts.

Rasmussen Leaves Wisconsin Foundry—Louis Rasmussen, general superintendent of the Wisconsin Aluminum Foundry Co., Manitowoc, Wis., for the last five years, has resigned to accept a position at Marshalltown, Iowa.

Worbois Is Detlaff Production Manager—H. L. Worbois, formerly service engineer of the Covert Gear Co. has been appointed chief engineer and production manager of the A. J. Detlaff Co. of Detroit, which is opening a new clutch department where a disk type of clutch of new design for passenger cars, trucks and tractors will be manufactured.

Los Angeles Car Branch in Illinois?—H. M. Gillian, representing the Los Angeles, Cal., Motor Car Co., is in Streator, Ill., with a view of interesting business men in a proposed branch plant for assembling purposes. It is planned to select one Illinois city which presents the most advantageous proposition. St. Joseph, Mo., is being considered for the Missouri branch.

Moore to Buy Plant at Danville—The Moore Motor Vehicle Co., Minneapolis, Minn., has concluded a deal for the purchase of the abandoned car shops at Danville, Ill. The business men of Danville take $25,000 worth of stock in the corporation. It is promised that 400 men will be given employment manufacturing motor cars before the close of next year. It is understood that Danville will be the principal branch of the Minneapolis institution.

Piqua Wants Tractor Plant—A company is being organized by the Piqua, Ohio, Chamber of Commerce and Chicago capitalists for the building of a tractor plant at Piqua. Recently tests of the Elgin tractor were made on a farm near Piqua, which proved completely successful. The Elgin has passed its experimental stages and is now ready to be put on the market. It is 10 ft. and 8 in. long and 4½ ft. wide and weighs approximately 2000 lbs. It is provided with a four-cylinder engine with about 10 hp. Paul W. Gillet and J. H. Latchford of Chicago are organizing the company. In all about $50,000 in stock has been subscribed. It is likely the name of the company will be changed to the Piqua Tractor Co.

Carmody Sells Champion Spark Plug—John D. Carmody, formerly with the U. S. Rubber Co. of Chicago, is now covering Nebraska and North and South Dakota for the Champion Spark Plug Co., Toledo, Ohio.

Heaslet Retires from Office—James G. Heaslet, vice-president in charge of engineering for the Studebaker Corp., has retired. However, he will continue as a member of the board of directors and has been retained in the advisory capacity of consulting engineer. His place as vice-president has been taken by M. F. Wollering, formerly production manager. The change becomes effective immediately. Wollering who has been associated with the Studebaker Corp. for many years, will be in charge of manufacturing at the Studebaker plants in Detroit, South Bend and Walkerville.

U. S. Truck Buys Plat—The United States Motor Truck Co. has purchased a large plot of land adjoining its factory at Covington, Ky., and will erect a new addition.

Braden Joins Standard Parts—James A. Braden has been appointed director of advertising for the Standard Parts Co., Cleveland, Ohio. Mr. Braden previously was advertising manager of the Diamond Rubber Co.

Fire Damages Body Plant—Fire broke out in Fleetwood, Pa., recently, damaging the plant of the Fleetwood Metal Body Co. to the extent of $65,000. The Packard Motor Car Co. building also was damaged, together with many chassis.

Turrill Joins Red Cross Corps—E. B. Turrill of the advertising department of the Saxon Motor Car Corp. has resigned to join the American Red Cross ambulance corps. Mr. Turrill has been with the Saxon company for three years.

New Saxon Plant Ready by Fall—The new plant of the Saxon Motor Car Corp. at Springwells in West Detroit has reached the point where windows and some machinery are being installed, and the company contemplates the storing of materials soon. It is expected that the new plant will be occupied before the first of September.

Gustafson Joins Jones Company—F. A. Gustafson, for eight years connected with the Velie Motors Corp. has been appointed superintendent of the painting department of the Jones Motor Car Co. R. D. Collins has become vice-president and a director of the company. He has been for several years with banking and lumber interests in the South.

Kuckuk Offers F-W-D Hospital Truck—Anton Kuckuk, a director of the Four-Wheel-Drive Auto Co., Clintonville, Wis., has offered to the Second Field Hospital, Wisconsin National Guard, a 3-ton F-W-D truck, completely equipped and valued at about $4,500, on condition that the people of Madison and vicinity provide two additional trucks necessary for fitting out the hospital corps.

Chalmers Takes Over Boston Agency—The Chalmers Motor Car Co. of Detroit has bought out the interests of O. L. Halsey of the Chalmers Motor Co. of New England, and the agency becomes a branch again. Mr. Halsey formerly sold Packards at St. Louis but went to Boston, Mass., a year ago to take on the Chalmers. Frank Allen will continue as manager, the position he held under Halsey.

Crow-Elkhart to Make Further Additions—Two additions to the Crow-Elkhart Motor car company, Elkhart, Ind., will be made in a short time. The additional space will be used for a new line of five-passenger convertibles and cabriolets the company expects to introduce this summer. A new woodworking machine shop costing $20,000 has been completed.

Chevrolet Holds Meeting—The Chevrolet Motor Co. was host recently to 150 executives of the Chevrolet and Mason companies at a banquet at Flint, Mich. J. H. Newmark, advertising manager, presided as toastmaster, and the principal talks were by A. B. C. Hardy, vice-president, and A. W. Sills, general sales manager, on early motor car days and the growth of the Chevrolet company. Mr. Sills stated that there are more than 4000 Chevrolet dealers. Other speakers included President G. M. Begole and treasurer W. S. Ballenger; W. W. Willett, general manager of the Chevrolet Motor Co. of Bay City, Mich.; A. C. Mason, president of the Mason Motor Car Co. and H. L. Innes, factory manager of the Chevrolet company.

Coming Motor Events

CONTESTS

—1917—

July	4	Visalia, Cal., road race.
July	4	Spokane, Wash., track.
July	4	Benton Harbor, Mich., track
July	4	Uniontown, Pa., speedway.
July	4	Tacoma, Wash., speedway.
*July	4	Omaha, Neb., speedway.
July	14	Rochester, N. Y., hillclimb.
July	15	Missoula, Mont., track.
July	17-19	Intercity Reliability.
July	22	Anaconda, Mont., track.
July	29	Great Falls, Mont., track.
Aug.	5	Billings, Mont., track.
Aug.	17	Flemington, N. J., track.
*Sept.	3	Cincinnati, Ohio, speedway.
Sept.	3	Uniontown, Pa., speedway.
Sept.	6	Red Bank, N. J., track.
Sept.	8	Pike's Peak, Colo., hill climb.
*Sept.	15	Providence, R. I. speedway.
Sept.	22	Allentown, Pa., track.
Sept.	28	Trenton, N. J., track.
*Sept.	29	New York, speedway.
Oct.	6	Uniontown, Pa., speedway.
Oct.	8	Danbury, Conn., track.
*Oct.	13	Chicago, speedway.
Oct.	13	Richmond, Va., track.
Oct.	27	New York, speedway.

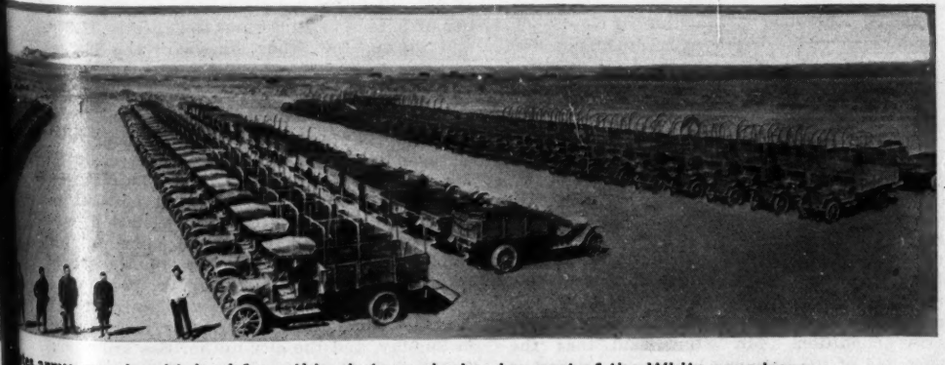
* A. A. A. Championship Award Event.

MEETINGS

June 25-26—Washington, D. C., S. A. E. midsummer.

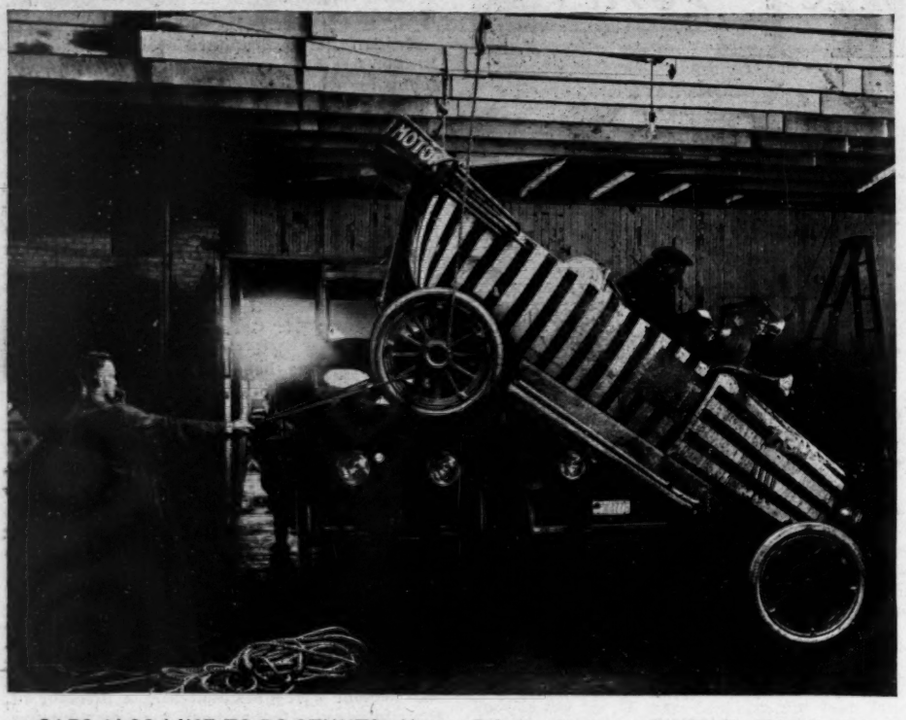
SHOWS

June	20-27	Montreal used car show.
Aug.	6-18	Fremont, Neb., tractor demonstration.
Sept.	9-15	Spokane, Wash., Interstate fair.
Sept.	2- 9	Milwaukee show, State Park fair, West Allis.
Oct	13-28	Dallas, Tex., state fair.



...es army may be obtained from this photograph showing part of the White squadron ... they are again ready for work after months of border grind with Pershing's forces

From the Four Winds



CARS ALSO LIKE TO DO STUNTS—Here a Briscoe stunt car elevates itself by its own power. The wheels are so arranged on the ropes that, revolving, they climb upward

MONTANA Cars Increase—There has been an exceptional increase in the number of motor cars in Montana this year. A year ago 24,000 licenses were issued, and indications point to more than 40,000 before the end of the year.

Crude Oil Up 10 Cents in California—The Standard Oil Co. of California has advanced all grades of crude oil 10 cents a barrel in the San Joaquin Valley, Ventura County, and Whittier, Fullerton and Santamaria fields, over prices announced on May 11.

Kentucky License Fee Sets Record—License collections in Kentucky to date this year have been as follows: 36,278 motor cars, $244,577.93; 1907 motorcycles, $5,118.82; chauffeurs, new and renewals, $2,824, which totals $252,530.75. This is $67,000 more for five months than for the entire year of 1916.

Yosemite Hotel Sky High—Tourists to Yosemite Valley this year may be housed in a new $250,000 hotel built on what is said to be the highest hotel site in the country. Unusually heavy snows have retarded travel to the valley this spring, but all roads are now open with the exception of the Tioga.

Chaser Hauls Mitchell Car from Depths—A Mitchell motor car lost in transit while being ferried across Chesapeake Bay four years ago has been recovered by the torpedo boat destroyer Benham. When the destroyer lifted its anchor the car was found caught in it. The top was nearly all gone, but the body and chassis were in fairly good condition.

New Scenic Highway in Arizona—The taxpayers of Greenlee county, Arizona, have voted to issue $200,000 in bonds, the proceeds to be used in the construction of their county's part of the highway between Metcalf and Springerville. The United States Forest Service has appropriated a similar sum to be used in constructing 30 miles of the road in Apache county. It is stated that this new highway will open to the motor tourist one of the most beautiful scenic regions of the southwest. The road will be 70 miles long. Its construction will be started as soon as the survey is finished and the fund from the sale of the bonds is available.

Illinois Fees Increase $324,000—A report issued by the secretary of state May 15 shows that the motor car fees in Illinois increased $324,000 over those up to the same date last year. Total receipts May 15, 1917, were $1,240,021, of which $1,169,220 was turned into the Springfield office and $70,801 into the Chicago office.

Plans Road Bond Expenditure—The California state highway commission is planning to put into use the $15,000,000 recently voted by bond issue for the continued improvement of the state's highways. Attention will be directed first to closing the paving gaps in the famous Coast road between Los Angeles and San Francisco.

New York Regulates Headlights—Governor Whitman has signed the Hewitt bill, which prescribes the manner in which headlamps must be controlled in the state of New York. Under its terms light rays must not rise higher than 42 in. from the roadway at a distance of 75 ft. from the car. The lamps also must illuminate an object placed 10 ft. from each side of the front of the car.

Inspect Fort Worth-El Paso Highway—W. B. Starr, secretary, and J. D. Merriweather, engineer, of the Fort Worth-El Paso Highway Association, have completed an inspection trip over the route of the proposed road that is to connect El Paso and Fort Worth, a distance of more than 600 miles. The road already is being used, but much remains to be done to place it in first class condition. Mr. Starr said that the east end of the highway is in good shape but that the western division, especially between Sierra Blanca and El Paso, is in bad condition. The road is to be placed in first class shape immediately.

Gasoline Exports Are 290,372,215 Gal.—Gasoline exports in the nine months ending March, 1917, totaled 290,372,215 gal., an increase of 81,138,286 as compared with the period ending March, 1916, when the total was 209,233,929. Special precautions were taken to guard gasoline shipments from submarines.

Add Roads to the H. C. of L.—Figures tabulated by the Cook County, Illinois, highway commissioner, indicate that, whereas the average cost a mile for surfacing the county's roads in 1914 was $14,300, it is now $20,700. The road work now under way is being done at a 10 per cent greater cost than last year's.

Motor Era Causes Worm to Turn—Railroads have been besieged time and again with claims for death and injury of horses, but with the motor era things are different. Chisholm & Moore Mfg. Co., Cleveland, Ohio, received a letter from the superintendent of the Pennsylvania lines recently in which claim for damages by one of its motor trucks to a locomotive was made. As the truck suffered no injury whatever, the owner gladly paid the $1.31 asked.

6,010 New Angel City Owners—Motorists in Los Angeles, Cal., in the first five months of the year purchased 6,010 new cars. On the basis of $750 as a conservative average cost for each car, $4,509,500 has been spent in new motor equipment. June 1 Los Angeles had 49,731 motor cars, divided among 38,070 owners. In the county, outside of the city, there are 25,040 cars, making a grand total of 76,771, or more than there were in the entire state only five years ago.

Goodyear Firefighters Reduce Fire Losses—During the last year the Goodyear force has fought 106 fires, which resulted in a physical loss of only $7,430—a remarkable record when it is remembered that the company's hazard is distributed over 75 acres of floor space. Goodyear uses the three-platoon system, with twenty men to each platoon. The department is organized with a chief and a captain for each platoon. The signal system used allows the department to reach any part of the plant in 90 sec.

How Motor Trucks Replace Horses—A recent report from Los Angeles County, California, shows it has less than half the number of horses today than in 1900 and in the meantime the number of registered motor cars in the county has increased from six to 79,146. In 1900 there were 47,000 horses, valued at $5,000,000, and six cars, valued at $8,400. The next ten years changed the number of horses to 31,000 and the cars to 11,000, and during the other six years the horses dropped to 20,000, while the cars increased to nearly 80,000.

"We Don't Sell Gasoline Sundays"—Mayor J. S. Adams, Sandersville, Ga., has announced to the public that hereafter there will be no sale of gasoline permitted in Sandersville on Sunday. All dealers have been notified to discontinue the sales, and no violation will be permitted. All who need gasoline for Sunday rides will have to obtain their gasoline during the week or let their cars remain idle. The state law plainly states that the usual lines of business must cease on Sunday, and the city authorities are using that law in the enforcement of the prohibition of Sunday gasoline sales.